

# Federal Research and Development Funding: FY2014

**John F. Sargent Jr.**  
Specialist in Science and Technology Policy

February 19, 2014

**Congressional Research Service**

7-5700

[www.crs.gov](http://www.crs.gov)

R43086

Report Documentation Page				Form Approved OMB No. 0704-0188	
Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.					
1. REPORT DATE <b>19 FEB 2014</b>		2. REPORT TYPE		3. DATES COVERED <b>00-00-2014 to 00-00-2014</b>	
4. TITLE AND SUBTITLE <b>Federal Research and Development Funding:FY2014</b>				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S)				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) <b>Congressional Research Service,The Library of Congress,,101 Independence Ave, SE,,Washington,DC,20540</b>				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT <b>Approved for public release; distribution unlimited</b>					
13. SUPPLEMENTARY NOTES					
14. ABSTRACT					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT <b>Same as Report (SAR)</b>	18. NUMBER OF PAGES <b>65</b>	19a. NAME OF RESPONSIBLE PERSON
a. REPORT <b>unclassified</b>	b. ABSTRACT <b>unclassified</b>	c. THIS PAGE <b>unclassified</b>			

## Summary

Congress completed action on the FY2014 regular appropriations bills with enactment of the Consolidated Appropriations Act, 2014 (P.L. 113-76), in January 2014. The act contains the 12 regular appropriations bills that fund federal departments and agencies and provide funding for most research and development (R&D) supported by the federal government. Prior to enactment of P.L. 113-76, FY2014 funding was provided by two continuing resolutions (P.L. 113-46 and P.L. 113-73). Where possible, CRS has identified and included in this report R&D funding in P.L. 113-76 for agencies and programs. For accounts that include funding for both R&D and non-R&D activities, CRS generally relies on agency reporting of how much is spent on R&D activities. This report will be updated as agencies make this information available.

President Obama's budget request for FY2014 included \$142.773 billion for research and development (R&D), a \$1.861 billion (1.3%) increase from the FY2012 actual funding level of \$140.912 billion. Both historically and in the President's request, funding for R&D has been highly concentrated in a few departments. Under President Obama's request, seven federal agencies would have received 95.3% of total federal R&D funding, with the Department of Defense (47.8%) and the Department of Health and Human Services (22.4%, primarily for the National Institutes of Health) alone accounting for more than 70% of total federal R&D funding.

Among the largest changes proposed in the President's request, the R&D budget of the Department of Defense would have fallen by \$4.625 billion (6.3%) from its FY2012 level, while R&D funding for the Department of Commerce's National Institute of Standards and Technology (NIST) would have increased by \$1.428 billion. The NIST growth was attributable to proposed increases in funding for its core research laboratories and the establishment of a National Network for Manufacturing Innovation (NNMI) with \$1 billion in mandatory funding. As envisioned, the NNMI would seek to promote the development of manufacturing technologies with broad applications. P.L. 113-76 does not address the Administration's proposal for National Network of Manufacturing Institutes (NNMI).

President Obama requested increases in the R&D budgets of NIST, the National Science Foundation, and the Department of Energy's Office of Science. These accounts were targeted for doubling over 7 years, from their FY2006 levels, by the America COMPETES Act, and over 10 years by the America COMPETES Reauthorization Act of 2010. The FY2014 request broke with President Obama's earlier budgets, which explicitly stated the goal of doubling funding for these accounts over their FY2006 aggregate level. Instead the Office of Science and Technology Policy asserted that the FY2014 request "maintains the President's commitment to increase funding for research at these three science agencies." The President's FY2014 request set a pace that would have resulted in doubling of the FY2006 level over a period of more than 17 years. FY2014 funding for these accounts provided by P.L. 113-6 sets a doubling pace of more than 20 years.

The President's request continued support for three multi-agency R&D initiatives in FY2014, proposing \$1.704 billion for the National Nanotechnology Initiative, a reduction of \$159 million (8.6%) over FY2012, due primarily to reductions in NNI funding at DOD and NSF; \$3.968 billion for the Networking and Information Technology Research and Development program, an increase of \$159 million (4.2%) over FY2012; and \$2.652 billion for the U.S. Global Change Research Program, an increase of \$151 million (6.0%) over FY2012.

In recent years, Congress has used a variety of mechanisms to complete the annual appropriations process after the start of the fiscal year. This may affect agencies' execution of their R&D budgets, including delaying or canceling some planned R&D and equipment acquisition.

## Contents

Overview .....	1
Federal R&D Funding Perspectives .....	2
By Agency .....	3
By Character of Work, Facilities, and Equipment .....	4
By Agency and Character of Work Combined .....	5
Defense-Related and Nondefense-Related R&D .....	6
Multiagency R&D Initiatives .....	7
Efforts to Double Certain R&D Accounts .....	7
National Nanotechnology Initiative .....	9
Networking and Information Technology Research and Development Program .....	10
U.S. Global Change Research Program .....	10
Materials Genome Initiative .....	11
Advanced Manufacturing Partnership .....	11
National Robotics Initiative .....	11
National Network for Manufacturing Innovation .....	12
Reorganization of STEM Education Programs .....	13
Treatment of FY2013 Rescissions and Sequestration in this Report .....	13
FY2014 Appropriations Status .....	15
Department of Defense .....	16
Department of Homeland Security .....	20
National Institutes of Health .....	24
Department of Energy .....	29
National Science Foundation .....	34
National Aeronautics and Space Administration .....	40
Department of Commerce .....	43
National Institute of Standards and Technology .....	43
National Oceanic and Atmospheric Administration .....	45
Department of Agriculture .....	47
Department of the Interior .....	50
U.S. Geological Survey .....	51
Other DOI Agencies .....	51
Environmental Protection Agency .....	53
Department of Transportation .....	56

## Figures

Figure 1. Funding for Accounts Targeted for Doubling: Appropriations, Authorizations, and Requests versus Selected Doubling Rates .....	9
---	---

## Tables

Table 1. Federal Research and Development Funding by Agency, FY2012-FY2014 .....	3
Table 2. Federal Research and Development Funding by Character of Work and Facilities and Equipment, FY2012-FY2014 .....	4
Table 3. Top R&D Funding Agencies by Character of Work, Facilities, and Equipment, FY2012-FY2014 .....	6
Table 4. Funding for Accounts Targeted for Doubling FY2006-FY2014 .....	8
Table 5. Alignment of Agency R&D Funding and Regular Appropriations Bills .....	15
Table 6. Department of Defense RDT&E .....	19
Table 7. Department of Homeland Security R&D and Related Programs .....	23
Table 8. National Institutes of Health Funding .....	28
Table 9. Department of Energy R&D and Related Activities .....	33
Table 10. NSF Funding by Major Account .....	38
Table 11. NASA R&D .....	42
Table 12. NIST .....	45
Table 13. NOAA R&D .....	47
Table 14. U.S. Department of Agriculture R&D .....	50
Table 15. Department of the Interior R&D .....	52
Table 16. Environmental Protection Agency S&T Account .....	55
Table 17. Department of Transportation R&D .....	59

## Contacts

Author Contact Information .....	60
----------------------------------	----

## Overview

The 113<sup>th</sup> Congress continues to take a strong interest in the health of the U.S. research and development (R&D) enterprise and in providing support for federal R&D activities. The federal government has played an important role in supporting R&D efforts that have led to scientific breakthroughs and new technologies, from jet aircraft and the Internet to communications satellites and defenses against disease. However, widespread concerns about the federal debt and recent and projected federal budget deficits are driving difficult decisions involving prioritization of R&D within the context of the entire federal budget and among competing priorities within the federal R&D portfolio.

The U.S. government supports a broad range of scientific and engineering R&D. Its purposes include addressing specific concerns such as national defense, health, safety, the environment, and energy security; advancing knowledge generally; developing the scientific and engineering workforce; and strengthening U.S. innovation and competitiveness in the global economy. Most of the R&D funded by the federal government is performed in support of the unique missions of the funding agencies.

Congress plays a central role in defining the nation's R&D priorities as it makes decisions about the size and distribution of R&D funding—overall, within agencies, and for specific programs. Some Members of Congress have expressed concerns about the level of federal funding (for R&D as for other purposes) in light of the current federal fiscal condition, deficit, and debt. As Congress moved to complete the FY2014 appropriations process it faced two overarching issues: the extent to which the federal R&D investment could grow in the context of increased pressure on discretionary spending and how available funding would be prioritized and allocated.

President Obama released his proposed FY2014 budget on April 10, 2013. Since FY2013 final appropriations figures (post-sequestration) were not yet available, the President's budget compared the FY2014 request generally to FY2012 funding rather than to FY2013 funding. As a result, some analyses in this report use FY2012 as the base comparison year; in some cases the analysis of growth rates is also presented in terms of compound annual growth rates (CAGRs).<sup>1</sup>

This report provides government-wide, multi-agency, and individual agency analyses of the President's FY2014 request as it relates to R&D and related activities. The President's budget sought \$142.773 billion for R&D in FY2014, a 1.3% increase (0.7% CAGR) over the actual FY2012 R&D funding level of \$140.912 billion.<sup>2</sup> Adjusted for inflation, the President's FY2014 R&D request represented a decrease of 2.6% (1.3% CAGR) from the FY2012 level.<sup>3</sup>

Among its provisions, the R&D funding in the President's proposed FY2014 budget maintained an emphasis on increasing support for the physical sciences and engineering, an effort consistent

---

<sup>1</sup> CAGR provides a measure of annual growth. CAGR is a calculated growth rate which, if applied year after year to a beginning amount, reaches a specified final amount.

<sup>2</sup> Funding levels included in this document are in current dollars unless otherwise noted. Inflation diminishes the purchasing power of federal R&D funds, so an increase that falls short of the inflation rate may reduce real purchasing power.

<sup>3</sup> As calculated by CRS using the GDP (chained) price index from Table 10.1, Gross Domestic Product and Deflators Used in the Historical Tables: 1940–2018, from the President's FY2014 budget, <http://www.whitehouse.gov/sites/default/files/omb/budget/fy2014/assets/hist10z1.xls>.

with the intent of the America COMPETES Act (P.L. 110-69) and the America COMPETES Reauthorization Act of 2010 (P.L. 111-358). These acts sought to achieve this objective by authorizing increased funding for accounts at three agencies with a strong R&D emphasis in these disciplines: the Department of Energy Office of Science, the National Science Foundation, and the Department of Commerce National Institute of Standards and Technology's core laboratory research and R&D facilities construction funding (collectively referred to as the "targeted accounts"). Appropriations provided to these agencies fell short of the levels authorized in P.L. 110-69 and P.L. 111-358. (See "Multiagency R&D Initiatives" for detailed information.)

More broadly, in a 2009 speech before members of the National Academy of Sciences, President Obama put forth a goal of increasing the national (public and private) investment in R&D to more than 3% of the U.S. gross domestic product (GDP). President Obama did not provide details on how this goal might be achieved (e.g., how much would be funded through increases in direct federal R&D funding or through indirect mechanisms such as the research and experimentation (R&E) tax credit).<sup>4</sup> Doing so likely would have required a substantial increase in government and/or corporate R&D spending. When President Obama set forth the goal in 2009, total U.S. R&D expenditures were \$404.7 billion, or approximately 2.90% of GDP, so reaching the 3% goal would have required an increase of 3.6% in national R&D spending. Since then, however, GDP has grown faster than R&D (due, in large measure, to comparatively small growth in federal R&D funding). As a result, total estimated U.S. R&D expenditures of \$428.2 billion in 2011 accounted for a somewhat smaller fraction (2.84%) of GDP than in 2009. Therefore, reaching the 3% goal in 2011 would have required an increase of 5.6% in national R&D spending.<sup>5</sup>

Analysis of federal R&D funding is complicated by several factors, such as inconsistency among agencies in the reporting of R&D and the inclusion of R&D in accounts with non-R&D activities. As a result of these and other factors, the R&D agency figures reported by the White House Office of Management and Budget (OMB) and White House Office of Science and Technology Policy (OSTP), including those shown in **Table 1**, may differ somewhat from the agency budget analyses that appear later in this report.

## Federal R&D Funding Perspectives

Federal R&D funding can be analyzed from a variety of perspectives that provide different insights. The following sections examine the data viewed by agency, by the character of the work supported, by a combination of these two perspectives, and by defense-related and nondefense-related R&D.

<sup>4</sup> The research and experimentation tax credit is frequently referred to as the research and development tax credit or R&D tax credit, though the credit does not apply to development expenditures. For additional information about the R&E tax credit, see CRS Report RL31181, *Research Tax Credit: Current Law and Policy Issues for the 113<sup>th</sup> Congress*, by Gary Guenther.

<sup>5</sup> GDP figures from Bureau of Economic Analysis, *Survey of Current Business*, 31 May 2012; R&D figures from National Science Foundation, National Center for Science and Engineering Statistics, *National Patterns of R&D Resources* (annual series).

## By Agency

The authorization and appropriations process views federal R&D funding primarily from the perspective of individual agencies and programs. **Table 1** provides data on R&D by agency for FY2012 (actual), FY2013 (estimate), and FY2014 (request) as reported by OMB. This table will be updated as post-sequestration funding data become available.

Under President Obama's FY2014 budget request, seven federal agencies would have received 95.3% of total federal R&D funding: Department of Defense (DOD), 47.8%; Department of Health and Human Services (HHS) (primarily the National Institutes of Health), 22.4%; Department of Energy (DOE), 8.9%; National Aeronautics and Space Administration (NASA), 8.1%; National Science Foundation (NSF), 4.3%; Department of Commerce (DOC), 1.9%; and Department of Agriculture (USDA), 1.8%. This report provides an analysis of the R&D budget requests for these agencies, as well as for the Department of Homeland Security (DHS), Department of the Interior (DOI), Department of Transportation (DOT), and the Environmental Protection Agency (EPA). In total, these 11 agencies accounted for 98% of FY2012 and FY2014 (requested) federal R&D funding.

The largest agency R&D increases proposed in the President's FY2014 request, compared with the FY2012 levels, were for DOE, \$1.928 billion (17.8%); DOC, \$1.428 billion (113.9%);<sup>6</sup> DHS, \$893 million (185.7%); HHS, \$669 million (2.1%); NSF, \$512 million (9.1%); and NASA, \$290 million (2.6%). Under the President's FY2014 budget request, DOD R&D funding would have been reduced by \$4.625 billion (6.3%) and EPA R&D by \$8 million (1.4%).

**Table 1. Federal Research and Development Funding by Agency, FY2012-FY2014**

(Budget authority, dollar amounts in millions)

Department/Agency	FY2012 Actual	FY2013 Estimate <sup>a</sup>	FY2014 Request	Change, 2012-2014		
				Dollar	Percent	CAGR
DOD	\$72,916		\$68,291	\$-4,625	-6.3%	-3.2%
HHS	31,377		32,046	669	2.1%	1.1%
DOE	10,811		12,739	1,928	17.8%	8.6%
NASA	11,315		11,605	290	2.6%	1.3%
NSF	5,636		6,148	512	9.1%	4.4%
DOC	1,254		2,682	1,428	113.9%	46.2%
USDA	2,331		2,523	192	8.2%	4.0%
DHS	481		1,374	893	185.7%	69.0%

<sup>6</sup> The Department of Commerce total includes the mandatory funding proposal for the National Network for Manufacturing Innovation at the National Institute of Standards and Technology. This program is discussed in the DOC NIST section of this report. Mandatory spending is typically provided in permanent or multi-year appropriations contained in the authorizing law, and therefore, the funding becomes available automatically each year, without legislative action by Congress. For additional information on mandatory spending, see CRS Report RL33074, *Mandatory Spending Since 1962*, by Mindy R. Levit and D. Andrew Austin.



Department/Agency	FY2012 Actual	FY2013 Estimate <sup>a</sup>	FY2014 Request	Change, 2012-2014		
				Dollar	Percent	CAGR
Department of Veterans Affairs	1,160		1,172	12	1.0%	0.5%
DOI	820		963	143	17.4%	8.4%
DOT	921		942	21	2.3%	1.1%
EPA	568		560	-8	-1.4%	-0.7%
Other	1,322		1,728	406	30.7%	14.3%
<b>Total</b>	<b>140,912</b>		<b>142,773</b>	<b>1,861</b>	<b>1.3%</b>	<b>0.7%</b>

**Source:** Executive Office of the President, OMB, *Analytical Perspectives, Budget of the United States Government, Fiscal Year 2014*, Table 21-1.

**Notes:** Totals may differ from the sum of the components due to rounding.

a. FY2013 post-sequestration funding data will be added when available.

## By Character of Work, Facilities, and Equipment

Federal R&D funding can also be examined by the character of work it supports—basic research, applied research, or development—and by funding provided for construction of R&D facilities and acquisition of major R&D equipment. (See **Table 2.**) President Obama's FY2014 request included \$33.162 billion for basic research, up \$1.422 billion (4.5%) from FY2012 (2.2% CAGR); \$34.963 billion for applied research, up \$3.345 billion (10.6%) from FY2012 (5.2% CAGR); \$71.463 billion for development, down \$3.781 billion (5.0%) from FY2012 (2.5% CAGR); and \$3.185 billion for facilities and equipment, up \$875 million (37.9%) from FY2012 (17.4% CAGR).

**Table 2. Federal Research and Development Funding by Character of Work and Facilities and Equipment, FY2012-FY2014**

(Budget authority, dollar amounts in millions)

	FY2012 Actual	FY2013 Estimate <sup>a</sup>	FY2014 Request	Change, 2012-2014		
				Dollar	Percent	CAGR
Basic research	31,740		33,162	\$1,422	4.5%	2.2%
Applied research	31,618		34,963	3,345	10.6%	5.2%
Development	75,244		71,463	-3,781	-5.0%	-2.5%
Facilities and Equipment	2,310		3,185	875	37.9%	17.4%
<b>Total</b>	<b>140,912</b>		<b>142,773</b>	<b>1,861</b>	<b>1.3%</b>	<b>0.7%</b>

**Source:** Executive Office of the President, OMB, *Analytical Perspectives, Budget of the United States Government, Fiscal Year 2014*, Table 21-1.

**Notes:** Totals may differ from the sum of the components due to rounding.

a. FY2013 post-sequestration funding data will be added when available.

## By Agency and Character of Work Combined

Combining these perspectives, federal R&D funding can be viewed in terms of each agency's contribution to basic research, applied research, development, and facilities and equipment. (See **Table 3.**) The overall federal R&D budget reflects a wide range of national priorities, from supporting advances in spaceflight to developing new and affordable sources of energy. These priorities and the mission of each agency contribute, in part, to the composition of that agency's R&D spending (i.e., the allocation between basic research, applied research, development, and facilities and equipment). In the President's FY2014 budget request, the Department of Health and Human Services, primarily the National Institutes of Health (NIH), accounted for nearly half of all federal funding for basic research.<sup>7</sup> HHS is also the largest funder of applied research, accounting for about 45% of all federally funded applied research in the President's FY2014 budget request.<sup>8</sup> DOD is the primary federal agency funder of development, accounting for 86.1% of total federal development funding in the President's FY2014 budget request.<sup>9</sup>

The federal government is the nation's largest supporter of basic research, funding 53.3% of U.S. basic research in 2011, primarily because the private sector asserts it cannot capture an adequate return on long-term fundamental research investments. In contrast, industry funded 22.5% of U.S. basic research in 2011 (with state governments, universities, and other non-profit organizations funding the remaining 24.2%).<sup>10</sup> In contrast to basic research, industry is the primary funder of applied research in the United States, accounting for an estimated 51.2% in 2011, while the federal government accounted for an estimated 38.8%.<sup>11</sup> Industry also provides the vast majority of funding for development. Industry accounted for an estimated 74.6% in 2011, while the federal government provided an estimated 23.7%.<sup>12</sup>

<sup>7</sup> Executive Office of the President, Office of Management and Budget, *Analytical Perspectives, Budget of the United States Government, Fiscal Year 2014*, Table 21-1.

<sup>8</sup> Executive Office of the President, Office of Management and Budget, *Analytical Perspectives, Budget of the United States Government, Fiscal Year 2014*, Table 21-1.

<sup>9</sup> Executive Office of the President, Office of Management and Budget, *Analytical Perspectives, Budget of the United States Government, Fiscal Year 2014*, Table 21-1.

<sup>10</sup> National Science Foundation, National Center for Science and Engineering Statistics, 2013, *National Patterns of R&D Resources: 2010–11 Data Update*, NSF 13-318, <http://www.nsf.gov/statistics/nsf13318/>.

<sup>11</sup> National Science Foundation, National Center for Science and Engineering Statistics, 2013, *National Patterns of R&D Resources: 2010–11 Data Update*, NSF 13-318, <http://www.nsf.gov/statistics/nsf13318/>.

<sup>12</sup> National Science Foundation, National Center for Science and Engineering Statistics, 2013, *National Patterns of R&D Resources: 2010–11 Data Update*, NSF 13-318, <http://www.nsf.gov/statistics/nsf13318/>.

**Table 3. Top R&D Funding Agencies by Character of Work, Facilities, and Equipment, FY2012-FY2014**

(Budget authority, dollar amounts in millions)

	FY2012 Actual	FY2013 Estimate <sup>a</sup>	FY2014 Request	Change, 2012 to 2014		
				Dollar	Percent	CAGR
<b>Basic Research</b>						
Health and Human Services	16,195		16,182	-13	-0.1%	0.0%
National Science Foundation	4,584		5,120	536	11.7%	5.7%
Energy	3,912		4,129	217	5.5%	2.7%
<b>Applied Research</b>						
Health and Human Services	14,933		15,660	727	4.9%	2.4%
Defense	4,728		4,602	-126	-2.7%	-1.3%
Energy	3,584		4,405	821	22.9%	10.9%
<b>Development</b>						
Defense	66,069		61,499	-4,570	-6.9%	-3.5%
NASA	5,344		5,135	-209	-3.9%	-2.0%
Energy	2,446		3,338	892	36.5%	16.8%
<b>Facilities and Equipment</b>						
Energy	869		867	-2	-0.2%	-0.1%
Homeland Security	97		778	681	702.1%	183.2%
National Science Foundation	535		548	13	2.4%	1.2%

**Source:** Executive Office of the President, OMB, *Analytical Perspectives, Budget of the United States Government, Fiscal Year 2014*, April 10, 2013.

**Note:** Top three funding agencies in each category based on FY2014 request.

a. FY2013 post-sequestration funding data will be added when available.

## Defense-Related and Nondefense-Related R&D

Federal R&D funding can also be characterized as defense-related or nondefense-related. Defense-related R&D is provided for primarily by the Department of Defense, but includes some funding at the Department of Energy and the Department of Justice Federal Bureau of Investigation. Defense-related R&D has generally provided for more than half of total federal R&D funding for the past two decades, fluctuating between 50% and 70%. Defense related R&D grew from 52.7% of total federal R&D funding in FY2001 to 60.5% in FY2008 and has since declined. The President's request for FY2014 included \$73.2 billion in defense-related R&D funding, or about 51.2% of the total R&D request.

## Multiagency R&D Initiatives

Although this report focuses primarily on the R&D activities of individual agencies, President Obama's FY2014 budget request supported several multiagency R&D initiatives. The following sections discuss several of these.

### Efforts to Double Certain R&D Accounts

In 2006, President Bush announced the American Competitiveness Initiative which, in part, sought to increase federal funding for physical sciences and engineering research by doubling funding over 10 years (FY2006-FY2016) for targeted accounts at three agencies: NSF, DOE Office of Science, and the scientific and technical research and services (STRS) and construction of research facilities (CRF) accounts at the DOC National Institute of Standards and Technology.

In 2007, Congress authorized substantial increases for these targeted accounts under the America COMPETES Act (P.L. 110-69), which set the combined authorization levels for these accounts for FY2008-FY2010 at a seven-year doubling pace.<sup>13</sup> However, funding provided for these agencies in the Consolidated Appropriations Act, 2008 (P.L. 110-161), the Omnibus Appropriations Act, 2009 (P.L. 111-8), and the Consolidated Appropriations Act, 2010 (P.L. 111-117) fell below these targets.<sup>14</sup> (See **Table 4** for individual and aggregate appropriations for the targeted accounts.)

In 2010, Congress passed the America COMPETES Reauthorization Act of 2010 (P.L. 111-358) which, among other things, authorized appropriations levels for the targeted accounts for FY2011-FY2013.<sup>15</sup> The aggregate authorization levels in this act for the targeted accounts are consistent with an 11-year doubling path, slower than the America COMPETES Act's 7-year doubling path. Moreover, aggregate FY2012 funding for the targeted accounts was approximately \$12.529 billion, \$1.631 billion less than authorized in the act, setting a pace to double over 17 years from the FY2006 level—more than twice the length of time originally envisioned in the 2007 America COMPETES Act and more than half longer than the doubling period established by the America COMPETES Reauthorization Act of 2010.<sup>16</sup>

In his FY2014 budget, President Obama requested \$13.532 billion in aggregate funding for the targeted accounts, an increase of \$1.003 billion (8.0%) above the enacted FY2012 aggregate funding level of \$12.529 billion. P.L. 113-6 provided \$12.141 billion in FY2013 funding after reductions for rescissions and sequestration. P.L. 113-76 provides \$12.950 billion in FY2014 funding for these accounts, an amount that sets a doubling pace of more than 20 years.

<sup>13</sup> CRS Report R41951, *An Analysis of Efforts to Double Federal Funding for Physical Sciences and Engineering Research*, by John F. Sargent Jr.

<sup>14</sup> In 2009, the American Recovery and Reinvestment Act of 2009 (P.L. 111-5) provided supplemental funding for several of the targeted accounts (approximately \$5.202 billion). This raised funding for the accounts above the target levels in that year.

<sup>15</sup> For additional information, see CRS Report R41231, *America COMPETES Reauthorization Act of 2010 (H.R. 5116) and the America COMPETES Act (P.L. 110-69): Selected Policy Issues*, coordinated by Heather B. Gonzalez.

<sup>16</sup> All doubling path calculations in this report use FY2006 as the baseline. For additional information on the doubling effort, see CRS Report R41951, *An Analysis of Efforts to Double Federal Funding for Physical Sciences and Engineering Research*, by John F. Sargent Jr.

In light of recent appropriations and continuing budget constraints, the future of the doubling path appears to be in question. In his FY2010 *Plan for Science and Innovation*, President Obama stated that he, like President Bush, would seek to double funding for basic research over 10 years (FY2006 to FY2016) at the ACI agencies.<sup>17</sup> In his FY2011 budget documents, President Obama extended the period over which he intended to double these agencies' budgets to 11 years (FY2006 to FY2017).<sup>18</sup> The FY2013 budget request, like the FY2012 budget request, reiterated President Obama's intention to double funding for the targeted accounts from their FY2006 levels but did not specify the length of time over which the doubling is to take place. President Obama's 2014 budget expresses a commitment to increasing funding for the targeted accounts, but does not commit to doubling, remaining silent on this goal and timeframe. In addition, the Office of Management and Budget's Public Budget Database, published as part of the President's FY2014 request, includes projections of budget authority for the targeted accounts through FY2018; projected FY2018 funding for the targeted accounts sets a doubling pace of approximately 19 years.

**Table 4. Funding for Accounts Targeted for Doubling  
FY2006-FY2014**

(budget authority, in millions of current dollars)

Agency	FY2006 Actual	FY2007 Actual	FY2008 Actual	FY2009 Actual	FY2009 ARRA	FY2010 Actual	FY2011 Actual	FY2012 Actual	FY2013 Actual <sup>a</sup>	FY2014 Request	FY2014 Enacted
NSF	5,646	5,884	6,084	6,469	2,402	6,972	6,913 <sup>b</sup>	7,033	6,884	7,626	7,172
DOE/Office of Science	3,632	3,837	4,083	4,807	1,633	4,964	4,843	4,874	4,621	5,153	5,071
NIST/core research <sup>c</sup>	395	434	441	472	220	515	497	567	580	694	651
NIST/facilities	174	59	161	172	360	147	70	55	56	60	56
<b>Total</b>	<b>9,846</b>	<b>10,214</b>	<b>10,768</b>	<b>11,920</b>	<b>4,615</b>	<b>12,598</b>	<b>12,323</b>	<b>12,529</b>	<b>12,141</b>	<b>13,533</b>	<b>12,950</b>

**Source:** NIST, budget requests for FY2008-FY2014, available at [http://www.nist.gov/public\\_affairs/budget/index.cfm](http://www.nist.gov/public_affairs/budget/index.cfm); DOE, budget requests for FY2008-FY2014, available at <http://www.cfo.doe.gov/crorgcf30.htm>; NSF, budget requests for FY2008-FY2014 available at <http://www.nsf.gov/about/budget>.

**Notes:** Totals may differ from the sum of the components due to rounding.

- FY2013 figures are agency-reported funding, incorporating reduction for rescissions and sequestration.
- Includes \$54 million transferred to the U.S. Coast Guard for icebreaking services (per P.L. 112-10).
- NIST core research is performed under its scientific and technical research and services (STRS) account.

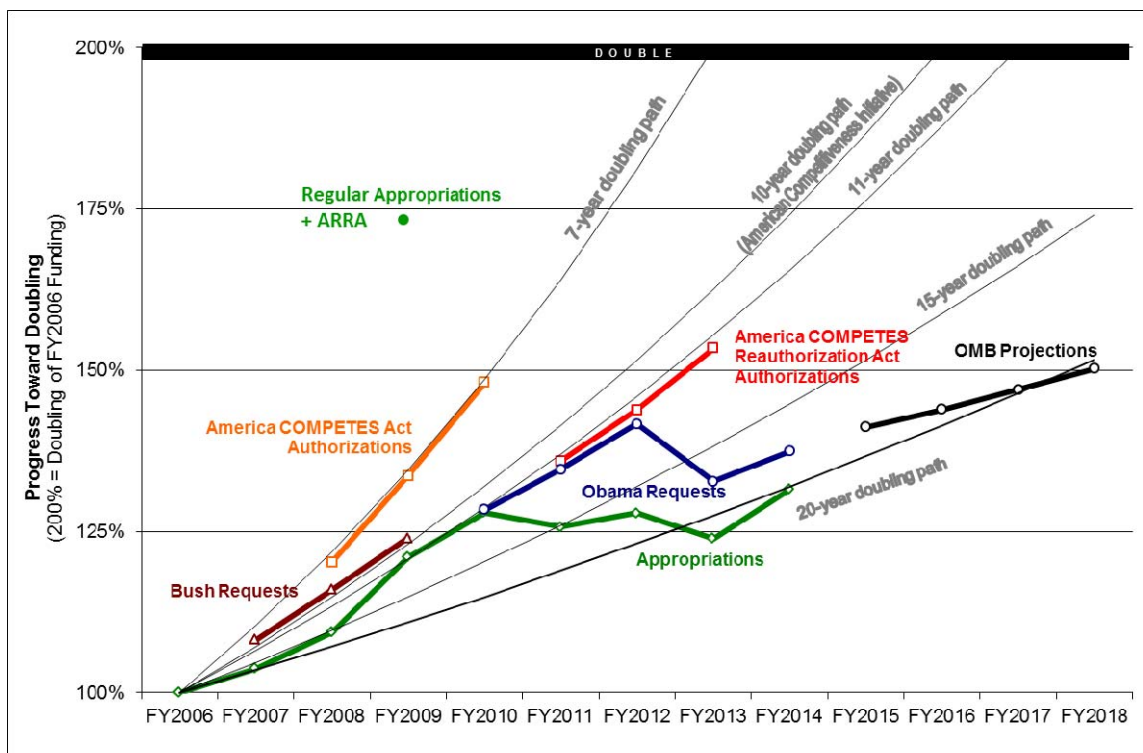
**Figure 1** shows total funding for the targeted accounts as a percentage of their FY2006 funding level, and illustrates how actual (FY2006-FY2012), requested (FY2007-FY2014), projected (FY2015-FY2018), and authorized appropriations (FY2008-FY2013) compare to different

<sup>17</sup> Executive Office of the President, Office of Science and Technology Policy, *The President's Plan for Science and Innovation: Doubling Funding for Key Basic Research Agencies in the 2010 Budget*, May 7, 2009, <http://www.whitehouse.gov/files/documents/ostp/budget/doubling.pdf>.

<sup>18</sup> Executive Office of the President, Office of Science and Technology Policy, *The President's Plan for Science and Innovation: Doubling Funding for Key Basic Research Agencies in the 2011 Budget*, February 1, 2010, <http://www.whitehouse.gov/sites/default/files/doubling%2011%20final.pdf>.

doubling rates using FY2006 as the base year. The thick black line at the top of the chart is at 200%, the doubling level. The data used in **Figure 1** are in current dollars, not constant dollars, thus the effect of inflation on the purchasing power of these funds is not taken into consideration.

**Figure 1. Funding for Accounts Targeted for Doubling: Appropriations, Authorizations, and Requests versus Selected Doubling Rates**



**Source:** Prepared by the Congressional Research Service (CRS) using agency FY2008-FY2014 budget justifications; the President's FY2014 budget request; agency authorization levels from the America COMPETES Act (P.L. 110-69) and the America COMPETES Reauthorization Act of 2010 (P.L. 111-358); agency current plans for FY2013 appropriations; and P.L. 113-76 for FY2014 appropriations.

**Notes:** The 7-year doubling pace represents annual increases of 10.4%, the 10-year doubling pace represents annual increases of 7.2%, the 11-year doubling pace represents annual increases of 6.5%, the 15-year doubling represents annual increases of 4.7%, and the 20-year doubling represents annual increases of 3.3%. Through compounding, these rates achieve the doubling of funding in the specified time period. The lines connecting aggregate appropriations for the targeted accounts are for illustration purposes only. Funding provided under the American Recovery and Reinvestment Act of 2009 (P.L. 111-5) is excluded from the FY2009 "Actual Appropriations" amount.

## National Nanotechnology Initiative

Launched by President Clinton in his FY2001 budget request, the National Nanotechnology Initiative (NNI) is a multiagency R&D initiative advancing understanding and control of matter at the nanoscale, where the physical, chemical, and biological properties of materials differ in fundamental and useful ways from the properties of individual atoms or bulk matter.<sup>19</sup>

<sup>19</sup> In the context of the NNI and nanotechnology, the nanoscale refers to a dimension of 1 to 100 nanometers.



The President is requesting \$1.704 billion for the NNI in FY2014, a reduction of \$159 million (8.6%) from the FY2012 actual level of \$1.863 billion. Among the most substantial changes in nanotechnology funding under the Administration's FY2014 request: reductions for DOD (\$209 million, 49.1%) and NSF (\$35 million, 7.6%), and increases for DOE (\$56 million, 17.8%), DHS (\$16 million, 86.5%), HHS (\$8 million, 1.7%), and DOC (\$7 million, 7.0%). Nanotechnology funding for other NNI agencies would remain essentially flat in FY2014.<sup>20</sup>

## Networking and Information Technology Research and Development Program

Established by the High-Performance Computing Act of 1991 (P.L. 102-194), the Networking and Information Technology Research and Development (NITRD) program is the primary mechanism by which the federal government coordinates its unclassified networking and information technology (NIT) R&D investments in areas such as supercomputing, high-speed networking, cybersecurity, software engineering, and information management.

President Obama has requested \$3.968 billion in FY2014 for the Networking and Information Technology Research and Development (NITRD) program. This is \$159 million (4.2%) above the FY2012 funding level. The most substantial agency increases in NITRD funding under the Administration's FY2014 request are for the DOC (up \$51 million, 42.6%), DOE (up \$44 million, 8.8%), DOD (up \$38 million, 3.0%), DHS (up \$22 million, 40.6%), and NSF (up \$11 million, 0.9%). The President's budget would reduce HHS NITRD funding by \$6 million (down 1.0%) and NASA by \$2 million (down 1.9%).<sup>21</sup>

## U.S. Global Change Research Program

The U.S. Global Change Research Program (USGCRP) coordinates and integrates federal research and applications to understand, assess, predict, and respond to human-induced and natural processes of global change.

President Obama has proposed \$2.652 billion for the U.S. Global Change Research Program (USGCRP) in FY2014, \$151 million (6.0%) above the FY2012 estimated level of \$2.501 billion. The most substantial agency increases in USGCRP funding under the Administration's FY2014 request are for NASA (up \$71 million, 5.0%), DOC (up \$45 million, 13.8%), DOI U.S. Geological Survey (up \$13 million, 22.2%), and USDA (up \$11 million, 9.8%).<sup>22</sup>

<sup>20</sup> Executive Office of the President, Office of Science and Technology Policy, *The 2014 Budget: A World-Leading Commitment to Science and Research—Science, Technology, Innovation, and STEM Education in the 2014 Budget*, Table 2, April 10, 2013. For additional information on the NNI, see CRS Report RL34401, *The National Nanotechnology Initiative: Overview, Reauthorization, and Appropriations Issues*, by John F. Sargent Jr.

<sup>21</sup> Ibid. For additional information on the NITRD program, see CRS Report RL33586, *The Federal Networking and Information Technology Research and Development Program: Background, Funding, and Activities*, by Patricia Moloney Figliola.

<sup>22</sup> Ibid. For additional information on the USGCRP, see CRS Report RL33817, *Climate Change: Federal Program Funding and Tax Incentives*, by Jane A. Leggett.

## Materials Genome Initiative

Announced in June 2011 by President Obama, the Materials Genome Initiative is a multi-agency initiative

to create new knowledge, tools, and infrastructure with a goal of enabling U.S. industries to discover, manufacture, and deploy advanced materials twice as fast than is possible today. Agencies are currently developing implementation strategies for the Materials Genome Initiative with a focus on: (1) the creation of a materials innovation infrastructure, (2) achieving national goals with advanced materials, and (3) equipping the next generation materials workforce. Materials science funding opportunities announced in FY2012 and requested in the FY2013 budget reflect these efforts.<sup>23</sup>

In congressional testimony, OSTP Director John Holdren stated that the purpose of the Materials Genome Initiative is to “speed our understanding of the fundamentals of materials science, providing a wealth of practical information that American entrepreneurs and innovators will be able to use to develop new products and processes” in much the same way that the Human Genome Project accelerated a range of biological sciences by identifying and deciphering the human genetic code.<sup>24</sup> The President’s FY2014 budget does not include a table of agency funding for the MGI, but the initiative is referred to in the Analytical Perspectives supplement to the President’s budget<sup>25</sup> and multiple times in the National Science Foundation’s *FY2014 Budget Request to Congress*.<sup>26</sup> Among the agencies funding MGI R&D are DOE, DOD, NSF, and NIST.

## Advanced Manufacturing Partnership

In June 2011, President Obama launched the Advanced Manufacturing Partnership (AMP), an effort to bring together “industry, universities, and the Federal government to invest in emerging technologies that will create high-quality manufacturing jobs and enhance our global competitiveness.”<sup>27</sup> Two R&D-focused components of the AMP are the National Robotics Initiative (NRI) and the National Network for Manufacturing Innovation (NNMI).

## National Robotics Initiative

The National Robotics Initiative (NRI) seeks to “develop robots that work with or beside people to extend or augment human capabilities.”<sup>28</sup> Among the goals of the program are increasing labor productivity in the manufacturing sector, assisting with dangerous and expensive missions in space, accelerating the discovery of new drugs, and improving food safety by rapidly sensing

<sup>23</sup> E-mail correspondence between OSTP and CRS, March 14, 2012.

<sup>24</sup> John P. Holdren, Director, Office of Science and Technology Policy, Executive Office of the President, testimony before the Senate Committee on Commerce, Science, and Transportation, Subcommittee on Science and Space, hearing on “Keeping America Competitive Through Investments in R&D,” March 6, 2012, [http://commerce.senate.gov/public/?a=Files.Serve&File\\_id=fed566eb-e2c8-49da-aec5-f84e4045890b](http://commerce.senate.gov/public/?a=Files.Serve&File_id=fed566eb-e2c8-49da-aec5-f84e4045890b).

<sup>25</sup> Office of Management and Budget, Executive Office of the President, *Analytical Perspectives, Budget of the United States Government, Fiscal Year 2014*, p. 371.

<sup>26</sup> National Science Foundation, *Fiscal Year 2014 Budget of the U.S. Government*, April 10, 2013, [http://www.nsf.gov/about/budget/fy2014/pdf/EntireDocument\\_fy2014.pdf](http://www.nsf.gov/about/budget/fy2014/pdf/EntireDocument_fy2014.pdf).

<sup>27</sup> Ibid.

<sup>28</sup> Ibid.



microbial contamination.<sup>29</sup> In FY2012, four agencies—NSF, NIH, NASA, and USDA—issued a joint solicitation to provide research funding for next-generation robotics. In addition, the Department of Defense, through multiple component agencies, is supporting the NRI through the Defense University Research Instrumentation Program. DOD is supporting the purchase of equipment to assist in robotics research to advance defense technologies and applications, including unmanned ground, air, sea, and undersea vehicles and autonomous systems.<sup>30</sup> The President's FY2014 budget does not include a table of agency funding for the NRI, but is referred to in the Analytical Perspectives supplement to the President's budget.<sup>31</sup> Also, a brief reference to NSF's participation in the NRI appears in the President's budget for FY2014 as well as multiple references in NSF's FY2014 budget request.<sup>32</sup>

## National Network for Manufacturing Innovation

The President's FY2014 budget once again proposes the establishment of a National Network for Manufacturing Innovation (NNMI) to promote the development of manufacturing technologies with broad applications. First proposed in President Obama's FY2013 budget request, this initiative would be carried out through a collaboration among NIST, DOD, DOE, and NSF.<sup>33</sup>

According to NIST, the NNMI would consist of

a network of institutes where researchers, companies, and entrepreneurs can come together to develop new manufacturing technologies with broad applications. Each institute would have a unique technology focus. These institutes will help support an ecosystem of manufacturing activity in local areas. The Manufacturing Innovation Institutes would support manufacturing technology commercialization by helping to bridge the gap from the laboratory to the market and address core gaps in scaling manufacturing process technologies.<sup>34</sup>

The President's budget requests a mandatory appropriation to NIST of \$1 billion over nine years (FY2014-FY2022) in support of up to 15 NNMI manufacturing innovation institutes. Funding for the program would be front-loaded with NIST anticipating obligating \$147.6 million in FY2014, and \$672 million in spending projected for FY2014-FY2018.<sup>35</sup> The joint explanatory statement accompanying the Consolidated Appropriations Act, 2014 (P.L. 113-76) states that "The agreement does not address the administration's proposal for National Network of Manufacturing Institutes (NNMI) because the NNMI legislative proposal has not been considered or approved by the Congress."

<sup>29</sup> Executive Office of the President, Office of Science and Technology Policy, website, August 3, 2011, <http://www.whitehouse.gov/blog/2011/08/03/supporting-president-s-national-robotics-initiative>.

<sup>30</sup> Ibid.

<sup>31</sup> Office of Management and Budget, Executive Office of the President, *Analytical Perspectives, Budget of the United States Government, Fiscal Year 2014*, p. 371.

<sup>32</sup> National Science Foundation, *Fiscal Year 2014 Budget of the U.S. Government*, April 10, 2013, [http://www.nsf.gov/about/budget/fy2014/pdf/EntireDocument\\_fy2014.pdf](http://www.nsf.gov/about/budget/fy2014/pdf/EntireDocument_fy2014.pdf).

<sup>33</sup> Executive Office of the President, Office of Science and Technology Policy, *The 2014 Budget: A World-Leading Commitment to Science and Research—Science, Technology, Innovation, and STEM Education in the 2014 Budget*, April 10, 2013.

<sup>34</sup> U.S. Department of Commerce, *FY2014 Budget in Brief*, February 2012, p. 123, [http://www.osec.doc.gov/bmi/budget/FY13BIB/fy2013bib\\_final.pdf](http://www.osec.doc.gov/bmi/budget/FY13BIB/fy2013bib_final.pdf).

<sup>35</sup> Office of Management and Budget, Executive Office of the President, *Fiscal Year 2014 Budget of the U.S. Government*, Supplemental Tables, Table S-9, April 10, 2013, p. 203.

## Reorganization of STEM Education Programs

The Administration's FY2014 budget proposed a broad reorganization and consolidation of federal science, technology, engineering, and mathematics (STEM) education programs—including programs with a potential nexus to federal R&D, such as research fellowships at mission agencies. Under the plan, the National Science Foundation, Department of Education, and Smithsonian Institution would become lead federal agencies for graduate/undergraduate STEM education, kindergarten-through-grade 12 STEM education, and informal science education, respectively.

The President proposed that certain STEM education programs at other federal agencies be reduced and their associated budget authority allocated to the three lead agencies. Other federal STEM education programs, including those at the lead agencies, also would have been consolidated under the plan. About half of existing federal STEM education programs would have been affected.

The House Committee on Appropriations report and the Senate Committee on Appropriations report both rejected the proposed reorganization plan for programs within the purview of the FY2014 Commerce, Justice, Science, and Related Agencies appropriations act. The House report noted that there may be individual instances in which the Committee accepts a change. The Senate report deferred action on the reorganization until the Office of Science and Technology Policy (OSTP) finalizes STEM education program assessments as required by the America COMPETES Reauthorization Act of 2010 (P.L. 111-358). The explanatory statement rejected the proposed reorganization (unless expressly noted) and directed OSTP to examine—in consultation with federal agencies and major external stakeholders—other possible reorganizations of the federal STEM education effort.<sup>36</sup>

## Treatment of FY2013 Rescissions and Sequestration in this Report

Rescissions specified in the Consolidated and Further Continuing Appropriations Act, 2013 (P.L. 113-6), coupled with sequestration requirements in the Budget Control Act of 2011 (BCA, P.L. 112-25) and sequestration process modifications made in the American Taxpayer Relief Act of 2012 (ATRA, P.L. 112-240) have complicated analysis of the level of federal R&D funding provided to federal agencies. The complication is particularly pronounced with respect to accounts, programs, projects, and activities that include both R&D and non-R&D funding as rescissions and sequestration reductions may be applied unequally to the R&D and non-R&D functions. Accordingly, in those cases where the FY2013 R&D funding level cannot be determined with a high level of confidence, no figures are provided. FY2013 figures will be added as agencies provide additional information that allows for an accurate determination of R&D funding. Appropriations accounts for some agencies contain only R&D; for most of those agencies, the post-rescission/pre-sequestration funding levels are included. Similarly, for those accounts with both R&D and non-R&D related activities that this report tracks in their entirety, post-rescission/pre-sequestration funding levels are included. The remainder of this section

<sup>36</sup> For more information on federal STEM education programs, see CRS Report R42642, *Science, Technology, Engineering, and Mathematics (STEM) Education: A Primer*, by Heather B. Gonzalez and Jeffrey J. Kuenzi.

provides background on the acts that require sequestration and the processes to be used in arriving at the amounts to be sequestered, as well as CRS resources that provide additional information.

FY2013 discretionary appropriations were considered in the context of the BCA, which established discretionary spending limits for FY2012-FY2021. The BCA also tasked a Joint Select Committee on Deficit Reduction to develop a federal deficit reduction plan for Congress and the President to enact by January 15, 2012. Because deficit reduction legislation was not enacted by that date, an automatic spending reduction process established by the BCA was triggered; this process consists of a combination of sequestration and lower discretionary spending caps, initially scheduled to begin on January 2, 2013. The “joint committee” sequestration process for FY2013 requires the Office of Management and Budget (OMB) to implement across-the-board spending cuts at the account and program level to achieve equal budget reductions from both defense and nondefense funding at a percentage to be determined, under terms specified in the Balanced Budget and Emergency Deficit Control Act of 1985 (BBEDCA, Title II of P.L. 99-177, 2 U.S.C. 900-922), as amended by the BCA. For further information on the Budget Control Act, see CRS Report R41965, *The Budget Control Act of 2011*, by Bill Heniff Jr., Elizabeth Rybicki, and Shannon M. Mahan.

The American Taxpayer Relief Act of 2012 (ATRA, P.L. 112-240), enacted on January 2, 2013, made a number of significant changes to the procedures in the BCA that will take place during FY2013. First, the date for the joint committee sequester to be implemented was delayed for two months, until March 1, 2013. Second, the dollar amount of the joint committee sequester was reduced by \$24 billion. Third the statutory caps on discretionary spending for FY2013 (and FY2014) were lowered. For further information on the changes to BCA procedures made by ATRA, see CRS Report R42949, *The American Taxpayer Relief Act of 2012: Modifications to the Budget Enforcement Procedures in the Budget Control Act*, by Bill Heniff Jr.

Pursuant to the BCA, as amended by ATRA, President Obama ordered that the joint committee sequester be implemented on March 1, 2013. The accompanying OMB report indicated a dollar amount of budget authority to be canceled to each account containing non-exempt funds. The sequester will ultimately be applied at the program, project, and activity (PPA) level within each account. Because the sequester was implemented at the time that a temporary continuing resolution was in force, the reductions were calculated on an annualized basis and will be apportioned throughout the remainder of the fiscal year. Although full year FY2013 funding has been enacted, the effect of these reductions on the budgetary resources that will ultimately be available to an agency at either the account or PPA level remain unclear until further guidance is provided by OMB as to how these reductions should be applied.

Section 3004 of P.L. 113-6 is intended to eliminate any amount by which the new budget authority provided in the act exceeds the FY2013 discretionary spending limits in Section 251(c)(2) of the Balanced Budget and Emergency Deficit Control Act, as amended by the Budget Control Act of 2011 and the American Taxpayer Relief Act of 2012. As enacted, this section provides two separate across-the-board rescissions—one for non-security budget authority and one for security budget authority—of 0%, to be applied at the program, project, and activity level. The section requires the percentages to be increased if OMB estimates that additional rescissions are needed to avoid exceeding the limits. Subsequent to the enactment of P.L. 113-6, OMB calculated that additional rescissions of 0.032% of security budget authority, and 0.2% of non-security budget authority, would be required.

## FY2014 Appropriations Status

The remainder of this report provides a more in-depth analysis of R&D in 12 federal departments and agencies that, in aggregate, receive more than 98% of federal R&D funding. Annual appropriations for these agencies are provided through eight of the 12 regular appropriations bills. For each agency covered in this report, **Table 5** shows the corresponding regular appropriations bill that provides funding for the agency, including its R&D activities.

Congress completed action on the FY2014 regular appropriations bills with enactment of the Consolidated Appropriations Act, 2014 (P.L. 113-76) in January 2014. The act contains the 12 regular appropriations bills that fund all federal departments and agencies and provide funding for most research and development (R&D) supported by the federal government. Prior to enactment of P.L. 113-76, FY2014 funding was provided by two continuing resolutions (P.L. 113-46 and P.L. 113-73).

In addition to this report, CRS produces individual reports on each of the appropriations bills. These reports can be accessed via the CRS website at <http://crs.gov/Pages/clis.aspx?cliid=73>. Also, the status of each appropriations bill is available on the CRS webpage, *Status Table of Appropriations*, available at <http://crs.gov/Pages/AppropriationsStatusTable.aspx?source=QuickLinks>.

**Table 5. Alignment of Agency R&D Funding and Regular Appropriations Bills**

Department/Agency	Regular Appropriations Bill
Department of Defense	Department of Defense Appropriations Act
Department of Homeland Security	Department of Homeland Security Appropriations Act
National Institutes of Health	Departments of Labor, Health and Human Services, and Education, and Related Agencies Appropriations Act
Department of Energy	Energy and Water Development and Related Agencies Appropriations Act
National Science Foundation	Commerce, Justice, Science, and Related Agencies Appropriations Act
Department of Commerce - National Institute of Standards and Technology - National Oceanic and Atmospheric Administration	Commerce, Justice, Science, and Related Agencies Appropriations Act
National Aeronautics and Space Administration	Commerce, Justice, Science, and Related Agencies Appropriations Act
Department of Agriculture	Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act
Department of the Interior	Department of the Interior, Environment, and Related Agencies Appropriations Act
Environmental Protection Agency	Department of the Interior, Environment, and Related Agencies Appropriations Act
Department of Transportation	Transportation, Housing and Urban Development, and Related Agencies Appropriations Act

**Source:** CRS website, FY2014 Status Table of Appropriations, available at <http://crs.gov/Pages/AppropriationsStatusTable.aspx?source=QuickLinks>.

## Department of Defense<sup>37</sup>

Congress supports research and development in the Department of Defense (DOD) primarily through its Research, Development, Test, and Evaluation (RDT&E) appropriation. The appropriation supports the development of the nation's future military hardware and software and the technology base upon which those products rely.

Nearly all of what DOD spends on RDT&E is appropriated in Title IV of the defense appropriation bill. (See **Table 6.**) However, RDT&E funds are also appropriated in other parts of the bill. For example, RDT&E funds are appropriated as part of the Defense Health Program, the Chemical Agents and Munitions Destruction Program, and the National Defense Sealift Fund. The Defense Health Program supports the delivery of health care to DOD personnel and their families. Program funds are requested through the Operations and Maintenance appropriations request. The program's RDT&E funds support congressionally directed research in such areas as breast, prostate, and ovarian cancer and other medical conditions. Congress appropriates funds for this program in Title VI (Other Department of Defense Programs) of the defense appropriations bill. The Chemical Agents and Munitions Destruction Program supports activities to destroy the U.S. inventory of lethal chemical agents and munitions to avoid future risks and costs associated with storage. Funds for this program are requested through the Defensewide Procurement appropriations request. Congress appropriates funds for this program also in Title VI. The National Defense Sealift Fund supports the procurement, operation and maintenance, and research and development of the nation's naval reserve fleet and supports a U.S. flagged merchant fleet that can serve in time of need. Requests for this fund are made as part of the Navy's Operations and Maintenance appropriation request. Congress appropriates funds for this program in Title V (Revolving and Management Funds) of the defense appropriations bill.

The Joint Improvised Explosive Device Defeat Fund (JIEDDF) also contains RDT&E monies. However, the fund does not contain an RDT&E line item as do the three programs mentioned above. The Joint Improvised Explosive Device Defeat Office, which administers the fund, tracks (but does not report) the amount of funding allocated to RDT&E. The JIEDDF funding is not included in the table below.

RDT&E funds also have been requested and appropriated as part of DOD's separate funding to support efforts in what the Bush Administration had termed the Global War on Terror (GWOT), and what the Obama Administration refers to as Overseas Contingency Operations (OCO). Typically, the RDT&E funds appropriated for GWOT/OCO activities go to specified Program Elements (PEs) in Title IV. However, they are requested and accounted for separately. The Bush Administration requested these funds in separate GWOT emergency supplemental requests. The Obama Administration, while continuing to identify these funds uniquely as OCO requests, has included these funds as part of the regular budget, not in emergency supplementals. However, the Obama Administration has asked for additional OCO funds in supplemental requests, if the initial OCO funding is not enough to get through the fiscal year.

In addition, GWOT/OCO-related requests/appropriations often include money for a number of transfer funds. These have included in the past the Iraqi Freedom Fund (IFF), the Iraqi Security

<sup>37</sup> This section was written by John Moteff, Specialist in Science and Technology Policy, CRS Resources, Science, and Industry Division.



Forces Fund, the Afghanistan Security Forces Fund, and the Pakistan Counterinsurgency Capability Fund. Another transfer fund is the Mine Resistant and Ambush Protected Vehicle Fund (MRAPVF). Congress typically makes a single appropriation into each of these funds, and authorizes the Secretary to make transfers to other accounts, including RDT&E, at his discretion.

For FY2014, the Obama Administration requested \$67.520 billion for DOD's baseline Title IV RDT&E. This was \$5.449 billion less than what was available in FY2012 for both baseline and OCO RDT&E. It was \$2.339 billion less than what was provided for baseline FY2013 RDT&E funding in the Consolidated and Continuing Appropriations Act, 2013 (P.L. 113-6). However, this does not consider the subsequent sequestration. According to the department's FY2014 Budget Briefing Documents, sequestration reduced the FY2013 RDT&E funding to \$63.400 billion. Therefore, the FY2014 request would have been \$4.120 billion above the FY2013 sequestered balance. The Administration also requested \$117 million in OCO RDT&E, approximately half of what was appropriated for OCO RDT&E in FY2013. The FY2014 OCO RDT&E request was directed almost exclusively toward classified programs.

In addition to the baseline Title IV RDT&E request, the Administration requested \$684 million in RDT&E through the Defense Health Program, \$613 million in RDT&E through the Chemical Agents and Munitions Destruction program, and \$56 million in RDT&E through the National Defense Sealift Fund for FY2014.

The House approved its version of the DOD appropriations bill (H.R. 2397) on July 24, 2013. The House provided \$66.399 billion for Title IV RDT&E, \$1.121 billion less than what was requested. It also approved \$117 million for OCO RDT&E, as requested. Reductions in the baseline program were often associated with program delays or program increases which the House considered to be unjustified. Two relatively large increases were \$250 million for the Office of the Secretary to help administer the Rapid Innovation Fund and \$173 million for missile defense programs within the Israeli Cooperative Programs line item. The House also approved \$56 million in RDT&E for the National Defense Sealift Fund (as requested) and \$604 million in RDT&E for the Chemical Agents and Munitions Destruction Program (\$9 million below the request). The House approved \$1.356 billion in RDT&E for the Defense Health Program (nearly doubling the request), which includes an additional \$20.5 million added on the floor of the House.

The Senate Appropriations Committee reported its version of the DOD appropriations bill (S. 1429) on August 1, 2013. The Committee recommended \$65.807 billion in baseline Title IV RDT&E, a little under \$600 million below the House approved figure. Relatively large increases were an additional \$173 million for the Israeli Cooperative Program, with the increase focused on missile defense technology, and \$150 million for the Rapid Innovation Program. Relatively large reductions included \$106 million in the Army's Warfighter Information Network, \$143 million in the Missile Defense Agency's Midcourse Defense Segment (with those funds transferred to the agency's operations and maintenance account), \$169 million in the Army's Manned Ground Vehicles program, and \$192 million in the Air Force's CSAR HH-130 recapitalization program. Except for the missile defense midcourse program, reductions were attributed to restoring acquisition accountability. The Senate Appropriations Committee also recommended \$56 million for the National Defense Sealift Fund (as requested), \$604 million for the Chemical Agents and Munitions Destruction program (as requested), and \$1.319 billion for RDT&E in the Defense Health Program. The Senate Appropriations Committee provided \$89 million in OCO-related RDT&E, providing none of the requested funds for Navy OCO-related funding, but increasing the Army's OCO RDT&E request by \$7 million.

The Consolidated Appropriations Act, 2014 (P.L. 113-76) provided \$62.995 billion for baseline Title IV RDT&E, \$4.525 billion below what was requested, and \$6.864 billion below what was appropriated in FY2013 before sequestration. The act provided another \$135 million for OCO-related RDT&E, \$18 million above the request. The act provided \$45 million for the National Defense Sealift Fund (\$11 million below the request), \$1.552 billion for RDT&E in the Defense Health Program (\$868 million above the request), and \$604 million in RDT&E for Chemical Agents and Munitions Destruction (\$9 million below the request).

RDT&E funding can be analyzed in different ways. Each of the military departments request and receive their own RDT&E funding. So, too, do various DOD agencies (e.g., the Missile Defense Agency and the Defense Advanced Research Projects Agency), collectively aggregated within the Defensewide account. RDT&E funding also can be characterized by budget activity (i.e., the type of RDT&E supported). Those budget activities designated as 6.1, 6.2, and 6.3 (basic research, applied research, and advanced technology development, respectively) constitute what is called DOD's Science and Technology Program (S&T) and represent the more research-oriented part of the RDT&E program. Budget activities 6.4 and 6.5 focus on the development of specific weapon systems or components (e.g., the Joint Strike Fighter or missile defense systems), for which an operational need has been determined and an acquisition program established. Budget activity 6.6 provides management support, including support for test and evaluation facilities. Budget activity 6.7 supports system improvements in existing operational systems.

Many congressional policymakers are particularly interested in S&T funding since these funds support the development of new technologies and the underlying science. Some in the defense community see ensuring adequate support for S&T activities as imperative to maintaining U.S. military superiority. The knowledge generated at this stage of development can also contribute to advances in commercial technologies.

The FY2014 Title IV baseline S&T funding request was \$11.984 billion, \$0.074 billion below what was available for S&T in FY2012. According to its FY2014 Budget Request Overview, the FY2014 S&T budget request emphasizes activities aligned with the department's recent shift in strategic focus from Iraq and Afghanistan to the Asia-Pacific region. This is reflected in funding for technologies aimed at defeating anti-access/area denial capabilities of potential adversaries, counter weapons of mass destruction, efficient operations in cyberspace and space, electronic warfare, and high-speed kinetic strike capability.

The House approved \$12.317 billion in Title IV baseline S&T funding, \$333 million more than what was requested. Each of the three S&T-related budget activities in all the accounts was increased above the requested level. The Senate Appropriations Committee recommended \$12.050 billion in Title IV baseline S&T funding. The Consolidated Appropriations Act provided \$12.185 billion in Title IV baseline S&T funding.

Within the S&T program, basic research (6.1) receives special attention, particularly by the nation's universities. DOD is not a large supporter of basic research, when compared to NIH or NSF. However, over half of DOD's basic research budget is spent at universities and represents the major contribution of funds in some areas of science and technology (such as electrical engineering and material science). The Administration requested \$2.165 billion for basic research for FY2014.

The House approved \$2.170 billion in basic research, roughly what was requested. The increase of \$5 million went to the Historically Black Colleges and Universities line item in the

Defensewide account. The Senate Appropriations Committee also recommended \$2.170 billion in basic research. However, it increased the Navy's Defense Research Science program by \$5 million. The Consolidated Appropriations Act provided \$2.167 billion.

**Table 6. Department of Defense RDT&E**

(in millions of dollars)

	<b>FY2012 Actual</b>	<b>FY2013 Enacted<sup>a</sup></b>		<b>FY2014 Request</b>		<b>FY2014 House</b>		<b>FY2014 Senate</b>		<b>FY2014 Enacted</b>	
<b>Budget Account</b>	<b>Base + OCO</b>	<b>Base</b>	<b>OCO</b>	<b>Base</b>	<b>OCO</b>	<b>Base</b>	<b>OCO</b>	<b>Base</b>	<b>OCO</b>	<b>Base</b>	<b>OCO</b>
Army	8,705	8,668	30	7,989	7	7,961	7	7,576	14	7,126	14
Navy	17,723	16,946	53	15,975	34	15,368	34	15,403		14,950	34
Air Force	26,631	25,407	53	25,703	9	24,947	9	24,946	9	23,585	9
Defensewide	19,722	18,613	112	17,667	66	17,876 <sup>b</sup>	66	17,695	66	17,086	78
Dir. Test & Eval.	188	224		186		247		186		246	
<b>Total Title IV— By Account<sup>c</sup></b>	<b>72,970</b>	<b>69,859</b>	<b>248</b>	<b>67,520</b>	<b>117</b>	<b>66,399</b>	<b>117</b>	<b>65,807</b>	<b>89</b>	<b>62,995</b>	<b>135</b>
<b>Budget Activity</b>											
6.1 Basic Research	2,010	2,128		2,165		2,170		2,170		2,167	
6.2 Applied Research	4,730	4,720		4,627		4,679		4,642		4,643	
6.3 Advanced Dev.	5,318	5,623		5,192		5,467		5,238		5,375	
6.4 Advanced Component Dev. and Prototypes	13,579	12,635	19	12,057		11,775		11,908	7	11,448	7
6.5 Systems Dev. And Demo	13,573	13,990	17	13,699	7	13,046	7	12,611	7	11,521	7
6.6 Management Support <sup>d</sup>	5,694	4,515	5	4,325		4,166		4,370		4,313	
6.7 Op. Systems Dev. <sup>e</sup>	28,065	26,247	206	25,456	110	25,106	110	24,868	75	23,528	122
<b>Total Title IV— by Budget Activity<sup>c</sup></b>	<b>72,970</b>	<b>69,859</b>	<b>247</b>	<b>67,520</b>	<b>117</b>	<b>66,410<sup>f</sup></b>	<b>117</b>	<b>65,807</b>	<b>89</b>	<b>62,995</b>	<b>135</b>
<b>Title V— Revolving and Management Funds</b>											
National Defense Sealift Fund	51	37		56		56		56		45	
<b>Title VI—Other Defense Programs</b>											
Office of Inspector General	0			0							



	<b>FY2012 Actual</b>	<b>FY2013 Enacted<sup>a</sup></b>		<b>FY2014 Request</b>		<b>FY2014 House</b>		<b>FY2014 Senate</b>		<b>FY2014 Enacted</b>	
<b>Budget Account</b>	<b>Base + OCO</b>	<b>Base</b>	<b>OCO</b>	<b>Base</b>	<b>OCO</b>	<b>Base</b>	<b>OCO</b>	<b>Base</b>	<b>OCO</b>	<b>Base</b>	<b>OCO</b>
Defense Health Program	1,274	1,307		684		1,356 <sup>g</sup>		1,319		1,552	
Chemical Agents and Munitions Destruction	411	647		613		604		604		604	
<b>Grand Total<sup>c,h</sup></b>	<b>74,706</b>	<b>71,850</b>	<b>247</b>	<b>68,873</b>	<b>117</b>	<b>68,415</b>	<b>117</b>	<b>67,786</b>	<b>89</b>	<b>65,196</b>	<b>135</b>

**Source:** CRS, adapted from the Department of Defense Budget, Fiscal Year 2014 RDT&E Programs (R-1), April 2013, relevant FY2014 Budget Justification (R-2) documents, H.R. 933, H.R. 2397, H.Rept. 113-113, S. 1429, and S.Rept. 113-85.

- a. Includes rescission of 0.1% pursuant to Section 3001, Div. G of H.R. 933, but not sequester.
- b. Includes \$10 million reduction made on the House floor to offset a \$10 million increase in prostate cancer research in the Defense Health Program.
- c. Total may differ from sum of components due to rounding.
- d. Includes funding for the Director of Test and Evaluation.
- e. Includes funding for classified programs.
- f. Does not include the \$10 million reduction to Defensewide RDT&E made on the House floor.
- g. Includes \$10 million added on the House floor for prostate cancer and additional \$10.5 million added for breast cancer and post-traumatic stress research.
- h. The “Grand Total” figure uses the “Total Title IV—by Account” figure.

## Department of Homeland Security<sup>38</sup>

The President requested \$1.838 billion for R&D and related programs in the Department of Homeland Security (DHS) in FY2014. This was a 64% increase from \$1.123 billion in FY2013.<sup>39</sup> The total included \$1.527 billion for the Directorate of Science and Technology (S&T), \$291 million for the Domestic Nuclear Detection Office (DNDO), and \$20 million for Research, Development, Test, and Evaluation (RDT&E) in the U.S. Coast Guard. The House-passed bill would have provided \$1.225 billion for S&T, \$291 million for DNDO, and \$10 million for Coast Guard RDT&E. The Senate-reported bill would have provided \$1.218 billion for S&T, \$289 million for DNDO, and \$20 million for Coast Guard RDT&E. The enacted appropriations were \$1.220 billion for S&T, \$285 million for DNDO, and \$19 million for Coast Guard RDT&E. (See **Table 7.**)

<sup>38</sup> This section was written by Daniel Morgan, Specialist in Science and Technology Policy, CRS Resources, Science, and Industry Division.

<sup>39</sup> FY2013 amounts in this section are from Department of Homeland Security, Office of the Chief Financial Officer, *U.S. Department of Homeland Security Fiscal Year 2013 Post-Sequestration Operating Plan*, April 26, 2013. They do not include funding appropriated by the Disaster Relief Appropriations Act, 2013 (P.L. 113-2). That act appropriated approximately \$3 million for the S&T Directorate and approximately \$4 million for DNDO.

The S&T Directorate is the primary DHS R&D organization.<sup>40</sup> Led by the Under Secretary for Science and Technology, the S&T Directorate performs R&D in several laboratories of its own and funds R&D performed by the DOE national laboratories, industry, universities, and others. The Administration requested \$1.527 billion for the S&T Directorate for FY2014. This was 91% more than the FY2013 operating plan level of \$801 million. The increase resulted largely from the request for \$714 million in Laboratory Facilities for construction of the National Bio- and Agro-Defense Facility (NBAF). The NBAF is a planned replacement for the current Plum Island Animal Disease Center. According to DHS, the FY2014 request (together with anticipated gift funds from the state of Kansas) would have been sufficient to fully fund NBAF construction, which DHS expects to complete in FY2020. The total estimated cost of the NBAF project, including the Kansas contribution and federal funds already appropriated, is \$1.230 billion. The previous estimate in the FY2012 budget was \$725 million.<sup>41</sup> Also in S&T, the Administration's request for \$31 million for University Programs in FY2014 was a decrease of 19% from \$38 million in the FY2013 operating plan. This decrease reflected a reduction in funding for university centers of excellence and the elimination of funding for scholarships and fellowships. The latter proposal was part of a government-wide consolidation of STEM education activities, discussed earlier in the "Reorganization of STEM Education Programs" section of this report.

The House bill would have provided \$1.225 billion for S&T. This total included \$404 million for NBAF construction, the amount needed to "fully leverage funding contributions by the State of Kansas" (i.e., to provide the 2-to-1 federal matching funds required for \$202 million in state bonds). The House provision of \$40 million for University Programs would have increased funding for university centers of excellence; the House report did not address the proposed elimination of scholarship and fellowship funding in University Programs.

The Senate bill would have provided \$1.218 billion for S&T. Like the House bill, it included \$404 million for NBAF, sufficient to "fully leverage" state contributions. The Senate recommendation of \$33 million for University Programs "recognize[d] the requested reduction ... resulting from the consolidation of the Scholars and Fellows program within the National Science Foundation."

The enacted appropriation for S&T was \$1.220 billion. This total included the same amount as the House and Senate bills for NBAF and \$40 million for University Programs. According to the joint explanatory statement, this level of funding for University Programs "will allow S&T to fund all existing centers [of excellence] at an appropriate level and establish a new center." No funds were provided for the S&T scholarships and fellowships program. According to DHS, it will work with NSF to ensure that consolidated STEM education activities align with DHS needs.

The Domestic Nuclear Detection Office is the DHS organization responsible for nuclear detection research, development, testing, evaluation, acquisition, and operational support. The Administration requested \$291 million for DNDO for FY2014, a decrease of 4% from \$303 million in the FY2013 operating plan. In the Research, Development, and Operations account, funding for Systems Architecture and Systems Development were to decrease relative to FY2013,

<sup>40</sup> For more information, see CRS Report R43064, *The DHS S&T Directorate: Selected Issues for Congress*, by Dana A. Shea.

<sup>41</sup> Department of Homeland Security, *Congressional Budget Justification: FY2012*, "Science and Technology Directorate: Research, Development, Acquisitions, and Operations," p. 134. The FY2013 budget did not present a cost estimate for NBAF. At the time the FY2013 budget was released, DHS was reassessing whether to go forward with the NBAF project.

while funding for Transformational R&D and Assessments were to increase. These shifts appeared to reflect DNDO's ongoing transition from large-scale, government-sponsored technology development initiatives to a commercial-first approach to technology acquisition. In the Systems Acquisition account, the request of \$14 million for Human Portable Radiation Detection Systems (HPRDS) was a 50% decrease from \$27 million in FY2013. The DHS budget justification for HPRDS, however, described the request as an increase relative to the \$8 million the program received under the FY2013 continuing resolution. It is unclear how the higher amount the program received in the FY2013 operating plan will affect the program's plans for FY2014. The House bill would have provided the requested amount for DNDO. The Senate bill would have provided \$289 million, with small reductions in the Management and Administration account and each of the six elements of the Research, Development, and Operations account. The enacted appropriation was \$285 million. This total included \$4 million less than the Administration requested for Transformational R&D, together with other small reductions similar to the Senate bill.

In September 2012, the Government Accountability Office (GAO) reported that although the S&T Directorate, DNDO, and the Coast Guard are the only DHS components that report R&D activities to the Office of Management and Budget, several other DHS components also fund R&D and activities related to R&D.<sup>42</sup> The GAO report found that DHS lacks department-wide policies to define R&D and guide reporting of R&D activities, and as a result, DHS does not know the total amount its components invest in R&D. The report recommended that DHS develop policies and guidance for defining, reporting, and coordinating R&D activities across the department, and that DHS establish a mechanism to track R&D projects. In March 2013, the explanatory statement for the Consolidated and Further Continuing Appropriations Act, 2013 (P.L. 113-6) directed the Secretary of Homeland Security, through the Under Secretary for Science and Technology, to establish a review process for all R&D and related work within DHS.<sup>43</sup> In April 2013, citing its September 2012 report, GAO listed DHS R&D as an area of concern in its annual report on fragmented, overlapping, or duplicative federal programs.<sup>44</sup> The House bill would have directed DHS to submit a report on reforms to its R&D programs, including a formal process for setting R&D priorities, a formal process for DHS-wide involvement in R&D decision-making and review, metrics for R&D program status and return on investment, and the implementation of GAO's recommendations. The Senate bill language included no provision on this topic, but report language directed DHS to implement policies and guidance for defining and overseeing R&D, in accordance with the GAO recommendations. The Senate report also directed DHS to "expeditiously continue" the implementation of R&D portfolio reviews in additional DHS components "to improve the coordinated approach to R&D and related activities within DHS." The joint explanatory statement directed DHS to comply with the language in the House and Senate reports about R&D prioritization and review; to brief the appropriations committees on its schedule and plans for future portfolio reviews; and, in accordance with GAO's recommendations, to implement policies and guidance for defining and overseeing R&D department-wide.

<sup>42</sup> Government Accountability Office, *Department of Homeland Security: Oversight and Coordination of Research and Development Should Be Strengthened*, GAO-12-837, September 12, 2012.

<sup>43</sup> *Congressional Record*, March 11, 2013, p. S1547.

<sup>44</sup> Government Accountability Office, *2013 Annual Report: Actions Needed to Reduce Fragmentation, Overlap, and Duplication and Achieve Other Financial Benefits*, GAO-13-279SP, April 2013.

**Table 7. Department of Homeland Security R&D and Related Programs**

(budget authority in millions of dollars)

	<b>FY2012 Actual</b>	<b>FY2013 Op. Plan</b>	<b>FY2014 Request</b>	<b>FY2014 House</b>	<b>FY2014 Sen. Cte.</b>	<b>FY2014 Enacted</b>
<b>Directorate of Science and Technology</b>	<b>\$673</b>	<b>\$801</b>	<b>\$1,527</b>	<b>\$1,225</b>	<b>\$1,218</b>	<b>\$1,220</b>
Management and Administration	135	127	130	129	129	129
R&D, Acquisition, and Operations	538	674	1,397	1,096	1,089	1,091
<i>Research, Development, and Innovation</i>	266	432	467	467	467	462
<i>Laboratory Facilities</i>	182	158	858	548	548	548
<i>Acquisition and Operations Support</i>	54	46	42	42	42	42
<i>University Programs</i>	37	38	31	40	33	40
<b>Domestic Nuclear Detection Office</b>	<b>290</b>	<b>303</b>	<b>291</b>	<b>291</b>	<b>289</b>	<b>285</b>
Management and Administration	38	38	38	37	37	37
Research, Development, and Operations	215	216	211	211	209	205
<i>Systems Architecture</i>	30	29	21	21	21	21
<i>Systems Development</i>	51	27	21	21	21	21
<i>Transformational R&amp;D</i>	40	71	75	75	75	71
<i>Assessments</i>	38	31	40	40	39	39
<i>Operations Support</i>	33	34	31	31	30	30
<i>National Technical Nuclear Forensics Center</i>	23	24	23	23	23	23
Systems Acquisition	37	50	43	43	43	43
<i>Radiation Portal Monitors Program</i>	2	1	7	7	7	7
<i>Securing the Cities</i>	22	21	22	22	22	22
<i>Human Portable Radiation Detection Systems</i>	14	27	14	14	14	14
<b>U.S. Coast Guard RDT&amp;E</b>	<b>28</b>	<b>20</b>	<b>20</b>	<b>10</b>	<b>20</b>	<b>19</b>
<b>TOTAL</b>	<b>991</b>	<b>1,123</b>	<b>1,838</b>	<b>1,527</b>	<b>1,527</b>	<b>1,524</b>

**Sources:** FY2012 actual and FY2014 request from DHS FY2014 congressional budget justification, <http://www.dhs.gov/xabout/budget/dhs-budget.shtm>. FY2013 operating plan from Department of Homeland Security, Office of the Chief Financial Officer, *U.S. Department of Homeland Security Fiscal Year 2013 Post-Sequestration Operating Plan*, April 26, 2013. FY2014 House from H.R. 2217 as passed by the House and H.Rept. 113-91. FY2014 Senate Committee from H.R. 2217 as reported in the Senate and S.Rept. 113-77. FY2014 enacted from P.L. 113-76 and joint explanatory statement, *Congressional Record*, January 15, 2014, pp. H934 and H937-H938.

**Notes:** FY2013 operating plan amounts do not include approximately \$7 million appropriated by the Disaster Relief Appropriations Act, 2013 (P.L. 113-2). Totals may differ from sum of components due to rounding.

## National Institutes of Health<sup>45</sup>

The FY2014 President's Budget requested a program level total of \$31.331 billion for NIH, an increase of \$2.180 billion (7.5%) over the FY2013 post-sequester operating plan level of \$29.151 billion, and \$471 million (1.5%) more than the comparable FY2012 amount of \$30.860 billion (see **Table 8**). The request would have given most of the institutes and centers roughly proportional increases, while a few specific activities would have received larger increases accounting for most of the additional funding.

On July 11, 2013, the Senate Appropriations Committee reported S. 1284 (S.Rept. 113-71), its FY2014 bill for the Departments of Labor, Health and Human Services, and Education, and Related Agencies (Labor/HHS). The committee-recommended program level funding for NIH would be \$31.184 billion, \$147 million (0.5%) lower than the President's request, \$2.033 billion (7.0%) over the FY2013 operating plan, and \$324 million (1.0%) more than FY2012. The committee report, after explaining the \$147 million cut compared to the Administration's request (see below), characterized the total for NIH as "effectively equal to the budget request." The House did not take action on a stand-alone FY2014 Labor/HHS bill. From October 2013 through mid-January 2014, federal agencies operated under the provisions of P.L. 113-46, the Continuing Appropriations Act, 2014 (H.R. 2775), signed into law by President Obama on October 17, 2013. The act provided continuing appropriations for FY2014 until January 15, 2014, generally at FY2013 post-sequestration levels. A short-term funding measure (H.J.Res. 106) provided funding through January 18, 2014, giving Congress time to pass the Consolidated Appropriations Act, 2014 (P.L. 113-76). The act provides a program level total of \$30.150 billion for NIH, a \$1 billion increase over the FY2013 post-sequester operating plan level.

**NIH Organization and Sources of Funding.** NIH supports and conducts a wide range of basic and clinical research, research training, and health information dissemination across all fields of biomedical and behavioral sciences. About 83% of NIH's budget goes out to the extramural research community in the form of grants, contracts, and other awards. The funding supports research performed by more than 300,000 non-federal scientists and technical personnel who work at more than 2,500 universities, hospitals, medical schools, and other research institutions around the country and abroad.<sup>46</sup> The agency's organization consists of the Office of the NIH Director and 27 institutes and centers. The Office of the Director (OD) sets overall policy for NIH and coordinates the programs and activities of all NIH components, particularly in areas of research that involve multiple institutes. The institutes and centers (collectively called ICs) focus on particular diseases, areas of human health and development, or aspects of research support. Each IC plans and manages its own research programs in coordination with OD. As shown in **Table 8**, Congress provides a separate appropriation to 24 of the 27 ICs, to OD, and to an intramural Buildings and Facilities account. (The other three centers, which perform centralized support services, are funded through assessments on the IC appropriations.)

Funding for NIH comes primarily from the annual Labor/HHS appropriations bill, with an additional amount for Superfund-related activities from the appropriations bill for the Department

<sup>45</sup> This section was written by Judith A. Johnson, Specialist in Biomedical Policy, CRS Domestic Social Policy Division. For background information on NIH, see CRS Report R41705, *The National Institutes of Health (NIH): Organization, Funding, and Congressional Issues*, by Judith A. Johnson.

<sup>46</sup> U.S. Department of Health and Human Services, *FY2014 Budget in Brief*, April 10, 2013, p. 34, <http://www.hhs.gov/budget/fy2014/fy-2014-budget-in-brief.pdf>.

of the Interior, Environment, and Related Agencies (Interior/Environment). Those two bills provide NIH's discretionary budget authority. In addition, NIH has received mandatory funding of \$150 million annually that is provided in the Public Health Service (PHS) Act for a special program on type 1 diabetes research, and also receives \$8.2 million annually for the National Library of Medicine from a transfer within PHS. The total funding available for NIH activities, taking account of add-ons and transfers, is the program level.

Except for the mandatory diabetes funding, Congress does not usually specify amounts for particular diseases or research areas. Similarly, NIH does not expressly budget by disease category.<sup>47</sup> Some bills may propose authorizations for designated research purposes, but funding would generally remain subject to the discretionary appropriations process.

NIH and other HHS agencies and programs that are authorized under the PHS Act are subject to a budget assessment called the PHS Program Evaluation Set-Aside, also called the evaluation tap. Section 241 of the PHS Act (42 U.S.C. §238j) authorizes the Secretary to use a portion of eligible appropriations to study the effectiveness of federal health programs and to identify ways to improve them. Congress sets the percentage level of the tap in the annual Labor/HHS appropriations acts, and also directs specific amounts of funding from the tap for transfer to a number of HHS programs. The set-aside has the effect of redistributing appropriated funds for specific purposes among PHS and other HHS agencies. NIH, with the largest budget among the PHS agencies, becomes the largest "donor" of program evaluation funds, and is a relatively minor recipient. Section 205 of the FY2012 Labor/HHS appropriations act capped the set-aside at 2.5%, which drew over \$700 million from the NIH budget. The same amount was assessed in FY2013 under the continuing appropriations act. The FY2014 President's Budget proposes to increase the PHS set-aside to 3.0%; the Senate committee rejected the increase, largely because of its effect on NIH. The committee estimated that the increased assessment would have taken an extra \$147 million from NIH.<sup>48</sup> In the Consolidated Appropriations Act, 2014 (H.R. 3547), the assessment is set at 2.5%. By convention, budget tables such as **Table 8** do not subtract the amount of the evaluation tap from the agencies' appropriations.<sup>49</sup>

**FY2014 President's Budget Request and Senate Committee Recommendation.** In the request, most of the institutes and centers would have received increases of about 1% compared to FY2012 and about 7% compared to the FY2013 operating level, with selected exceptions reflecting program priorities. The Senate committee largely supported the Administration's priorities, with a few variations. NIH describes its areas of emphasis for FY2014 under four broad themes that build on current activities, provide for some new initiatives, and continue the implementation of an organizational restructuring for translational medicine begun in FY2012.

**Theme 1: Investing in Basic Research.** About 53% of the proposed budget would have been for basic research on the causes of disease onset and progression. In neurosciences, about \$40 million was requested for the new multi-agency Brain Research through Application of Innovative Neurotechnologies (BRAIN) initiative to develop tools for the study of complex brain functions. The Senate committee supported that amount as an initial investment. To improve the handling,

<sup>47</sup> See NIH website, "Estimates of Funding for Various Research, Condition, and Disease Categories (RCDC)," [http://report.nih.gov/categorical\\_spending.aspx](http://report.nih.gov/categorical_spending.aspx).

<sup>48</sup> See S.Rept. 113-71 on S. 1284, p. 41 and p. 83.

<sup>49</sup> For further information on the PHS Evaluation Set-Aside, see CRS Report R43304, *Public Health Service Agencies: Overview and Funding*, coordinated by C. Stephen Redhead.



sharing, and analysis of large digital datasets of information, \$41 million was requested for a new program called Big Data to Knowledge (BD2K) through the NIH Common Fund.

**Theme 2: Advancing Translational Sciences.** Translational medicine, a function of all the ICs, focuses on converting basic research discoveries into clinical applications that benefit patients. In the FY2012 appropriations act, Congress approved an NIH reorganization that consolidated various programs into a new National Center for Advancing Translational Sciences (NCATS). NCATS explores improved methods to test possible new therapies and encourage their commercialization and dissemination into clinical practice. The FY2014 request for NCATS was \$666 million, an increase of \$91 million (16%) over its FY2012 first-year budget. The Senate committee approved \$661 million, a 15% increase over FY2012 and \$119 million (22%) above the FY2013 operating plan level. Over \$40 million of the increase would go to expanding the Cures Acceleration Network (CAN) from \$10 million at its start in FY2012 to \$50 million in FY2014. The Consolidated Appropriations Act, 2014 (H.R. 3547), allocated \$633 million for NCATS and \$9.8 million for CAN.

**Theme 3: Recruiting and Retaining Diverse Scientific Talent and Creativity for the Research Workforce.** NIH analysis of the biomedical workforce and future training needs has led to a special focus on promoting diversity and understanding barriers to career advancement. NIH is implementing new measures, supported by the Senate committee, to assist trainees and track their career progress. The request included \$32 million for a new Workforce Diversity Initiative being piloted through the NIH Common Fund. It will support a consortium of under-resourced institutions and create a National Research Mentoring Network. NIH requested \$776 million for its major research training program, the Ruth L. Kirschstein National Research Service Awards, with stipend increases for trainees. The request was \$14 million (2%) above the FY2012 level and \$39 million (5%) above the FY2013 operating plan.

**Theme 4: Restoring American Competitiveness.** The NIH budget summary offers economic arguments for support of health research.<sup>50</sup> It cites studies of the impact of health research on, for example, reductions in death rates and increased life expectancy, as well as studies linking NIH funding to direct and indirect support of U.S. jobs and to growth of private investment in life sciences research. The summary discusses global competition in the sciences, especially Asian and European R&D efforts, and warns of erosion in the U.S. leadership position, an observation echoed in the committee report.

The following are selected other program changes and areas of emphasis in NIH accounts.

**Alzheimer's disease research:** To continue implementing the research components of the National Plan to Address Alzheimer's Disease (AD), NIH estimates it will spend \$562 million on AD research in FY2014, up \$59 million (12%) from FY2012. The total budget request for the National Institute on Aging (NIA), at 7% above FY2012, included an increase of \$80 million (24%) for research on AD. The Senate committee recommended a 6% increase for NIA over FY2012 (14% over the FY2013 operating plan), but declined to specify an amount for AD research. The Consolidated Appropriations Act, 2014 (H.R. 3547), provided a 4.5% increase for

<sup>50</sup> U.S. Department of Health and Human Services, National Institutes of Health, *FY2014 Justification of Estimates for Appropriations Committees*, Vol. I - Overview/Executive Summary, April 10, 2013, pp. ES-24-28, [http://officeofbudget.od.nih.gov/pdfs/FY14/Tab%201%20-%20Executive%20Summary\\_final.pdf](http://officeofbudget.od.nih.gov/pdfs/FY14/Tab%201%20-%20Executive%20Summary_final.pdf).

NIA over FY2012 (12.5% over the FY2013 operating plan), but did not specify an amount for AD research.

***Institutional Development Awards (IDeA):*** The IDeA program, housed in the National Institute of General Medical Sciences, supports research capacity and infrastructure grants at institutions in states that have historically received less NIH research support. For FY2014, NIH requested \$225 million for IDeA, reversing an increase Congress gave the program in FY2012. The Senate committee rejected the proposed cut and recommended restoring the FY2012 level of \$276 million, commenting also that the eligibility criteria for the grants should be revisited. The Consolidated Appropriations Act, 2014 (H.R. 3547), allocated \$273 million for IDeA.

***Science, Technology, Engineering, and Mathematics (STEM) education:*** As part of a proposed government-wide reorganization of STEM education (see “Reorganization of STEM Education Programs”), the Administration planned to eliminate or consolidate nine NIH STEM programs totaling \$26 million, including a \$15.4 million reduction in the Science Education Partnership Awards program in OD. Both the Senate committee and the Consolidated Appropriations Act, 2014 (H.R. 3547) directed NIH to continue funding the programs.

***Office of the Director/Common Fund:*** The FY2014 request for OD included new funding for the Common Fund and for strategic initiatives, such as \$31 million for a new Biomedical Innovation Opportunities-Fund (BIO-F) to facilitate a rapid response to new ideas and unexpected scientific opportunities. The Common Fund supports research in emerging areas of scientific opportunity, public health challenges, or knowledge gaps that might benefit from collaboration between two or more institutes or centers. The request for the Common Fund was \$573 million, \$28 million (5%) higher than the FY2012 level, including funding for the new BD2K program. The Senate committee recommended \$568 million for the Common Fund, while the Consolidated Appropriations Act, 2014 (H.R. 3547) provided \$533 million.

***Research Project Grants:*** The main funding mechanism for supporting extramural research is research project grants (RPGs), which are competitive, peer-reviewed, and largely investigator-initiated. The FY2014 budget requested total funding for RPGs of \$16.9 billion, representing about 54% of NIH’s proposed budget. The amount is an increase of \$382 million (2%) over the FY2012 level and \$1.384 billion (9%) over the FY2013 operating plan. The request would support an estimated 36,610 RPG awards, 351 more grants than in FY2012 and 1,708 more grants than in FY2013. Within that total, 10,269 would be competing RPGs, 1,283 (14%) more than in FY2012 and 1,986 (24%) more than in FY2013. (“Competing” awards means new grants plus competing renewals of existing grants.) The average cost of a competing RPG in FY2014 is estimated to be about \$456,000, up from about \$421,000 in FY2012. The increase is mainly due to the cycling of high-cost HIV/AIDS Clinical Trials Networks grants into competing status in FY2014. After adjusting for those large grants, the average cost of competing RPGs is estimated to be about \$420,000, or approximately the same as in FY2012. To maximize the number of new and competing grants in FY2014, NIH proposed continuing the FY2012 grant awards policy of eliminating inflation increases for future year commitments for all competing and non-competing awards.<sup>51</sup> Adjustments for special needs, however, such as equipment and added personnel, would

<sup>51</sup> National Institutes of Health, *NIH Fiscal Policy for Grant Awards - FY2012*, Notice NOT-OD-12-036, January 20, 2012, <http://grants.nih.gov/grants/guide/notice-files/NOT-OD-12-036.html>. See also the NIH Extramural Financial Operations website at <http://grants.nih.gov/grants/financial/index.htm> for yearly plans and resources.



continue to be accommodated. The Senate committee and the Consolidated Appropriations Act, 2014 (P.L. 113-76) did not comment on specific funding mechanisms or grants policies.

**Table 8. National Institutes of Health Funding**

(in millions of dollars)

<b>National Institutes/National Centers; Other Components</b>	<b>FY2012 Actual<sup>a</sup></b>	<b>FY2013 Operating Plan<sup>b</sup></b>	<b>FY2014 Request</b>	<b>FY2014 Final Bill</b>
National Cancer Institute (NCI)	5,063	4,779	5,126	4,923
National Heart, Lung, & Blood Institute (NHLBI)	3,073	2,901	3,099	2,989
Dental/Craniofacial Research (NIDCR)	410	387	412	399
Diabetes/Digestive/Kidney (NIDDK) <sup>c</sup>	1,794	1,693	1,812	1,744
Neurological Disorders/Stroke (NINDS)	1,623	1,532	1,643	1,588
Allergy/Infectious Diseases (NIAID) <sup>d</sup>	4,482	4,231	4,579	4,359
General Medical Sciences (NIGMS)	2,426	2,291	2,401	2,364
Child Health/Human Development (NICHD)	1,319	1,245	1,339	1,283
National Eye Institute (NEI)	701	662	699	682
Environmental Health Sciences (NIEHS)	684	646	691	665
National Institute on Aging (NIA)	1,120	1,040	1,193	1,171
Arthritis/Musculoskeletal/Skin Diseases (NIAMS)	535	505	541	520
Deafness/Communication Disorders (NIDCD)	416	392	423	404
National Institute of Nursing Research (NINR)	145	136	146	141
Alcohol Abuse/Alcoholism (NIAAA)	459	433	464	446
National Institute on Drug Abuse (NIDA)	1,051	993	1,072	1,025
National Institute of Mental Health (NIMH) <sup>d</sup>	1,478	1,395	1,466	1,446
Nat'l Human Genome Research Inst (NHGRI)	512	483	517	498
Biomedical Imaging/Bioengineering (NIBIB)	338	319	339	329
Complementary/Alternative Medicine (NCCAM)	128	121	129	124
Minority Health/Health Disparities (NIMHD)	276	260	283	268
Fogarty International Center (FIC)	69	66	73	68
Advancing Translational Sciences (NCATS)	574	542	666	633
National Library of Medicine (NLM)	365	318	382	328
Office of Director (OD)	1,457	1,436	1,473	1,400
Buildings & Facilities (B&F)	125	118	126	129
<b>Subtotal, Labor/HHS Appropriation</b>	<b>30,623</b>	<b>28,926</b>	<b>31,094</b>	<b>29,926</b>
Superfund (Interior appropriation to NIEHS) <sup>e</sup>	79	75	79	77
<b>Total, NIH discretionary budget authority</b>	<b>30,702</b>	<b>29,001</b>	<b>31,173</b>	<b>30,003</b>
Pre-appropriated type I diabetes funds <sup>f</sup>	150	142	150	139
PHS Evaluation Tap funding <sup>g</sup>	8	8	8	8

National Institutes/National Centers; Other Components	FY2012 Actual <sup>a</sup>	FY2013 Operating Plan <sup>b</sup>	FY2014 Request	FY2014 Final Bill
<b>Total, NIH program level</b>	<b>30,860</b>	<b>29,151</b>	<b>31,331</b>	<b>30,150</b>

**Sources:** FY2012 Actual and FY2014 Request are adapted by CRS from National Institutes of Health, *Justification of Estimates for Appropriations Committees, FY2014*, Vol. I—Overview/Supplementary Tables, April 10, 2013, p. ST-2, [http://officeofbudget.od.nih.gov/pdfs/FY14/FY%202014\\_Supplementary%20Tables.pdf](http://officeofbudget.od.nih.gov/pdfs/FY14/FY%202014_Supplementary%20Tables.pdf). FY2013 Operating Plan is from NIH Office of Budget, “Operating Plan—Allocation by IC,” <http://officeofbudget.od.nih.gov/cy.html>. FY2014 Final Bill amounts are from the Consolidated Appropriations Act, 2014, (P.L. 113-76), H.R. 3547 Joint Explanatory Statement, Division H, <http://docs.house.gov/billsthisweek/20140113/113-HR3547-JSOM-G-I.pdf>.

**Notes:** Totals may differ from the sum of the components due to rounding.

- a. NIH FY2012 appropriations were provided in Division F (Labor/HHS/ Education) and Division E (Interior/Environment) of the Consolidated Appropriations Act, 2012 (P.L. 112-74). Amounts shown reflect across-the-board rescissions of 0.189% (Division F) and 0.16% (Division E). FY2012 reflects Secretary’s transfer of \$8.727 million to Health Resources and Services Administration for Ryan White AIDS and Secretary’s net transfer of \$18.273 million for Alzheimer’s disease research to National Institute on Aging (NIA) from other ICs. FY2012 figures are shown on a comparable basis to FY2014, reflecting transfers from ICs to National Library of Medicine (NLM).
- b. FY2013 Operating Plan reflects final funding levels under P.L. 113-6, the Consolidated and Further Continuing Appropriations Act, 2013 (which provided a program level total of \$30.877 billion), reduced by the March 1, 2013, sequestration (-\$1.553 billion) and the April 3, 2013, administrative transfers (-\$173 million). FY2013 IC and NLM amounts are not comparable to FY2012 and FY2014 as the FY2013 figures do not reflect transfers from ICs to NLM.
- c. Amounts for the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) do not include mandatory funding for type 1 diabetes research (see note f).
- d. The FY2014 request shifts a \$27 million program on HIV/AIDS behavioral health research from the National Institute of Mental Health (NIMH) to the National Institute of Allergy and Infectious Diseases (NIAID). The Senate committee concurred, noting that the resulting decrease in NIMH funding did not reflect a cut to core NIMH activities.
- e. This is a separate account in the Interior/Environment appropriations for National Institute of Environmental Health Sciences (NIEHS) research activities related to Superfund. FY2014 Final Bill amount is from the Consolidated Appropriations Act, 2014, (P.L. 113-76), H.R. 3547 Joint Explanatory Statement, Division G, <http://docs.house.gov/billsthisweek/20140113/113-HR3547-JSOM-G-I.pdf>.
- f. Mandatory funds available to NIDDK for type 1 diabetes research under PHS Act §330B (provided by P.L. 111-309 and P.L. 112-240). Funds have been appropriated through FY2014. The FY2014 amount was reduced by \$11 million (7.2%) due to the FY2014 sequestration.
- g. Additional funds for NLM from PHS Evaluation Set-Aside (§241 of PHS Act).

## Department of Energy<sup>52</sup>

The Administration requested \$12.618 billion in FY2014 for Department of Energy (DOE) R&D and related activities, including programs in three major categories: science, national security, and energy. This request was 17.1% more than the estimated FY2013 appropriation (after rescissions and sequestration) of \$10.779 billion. The House bill would have provided \$9.888 billion. The Senate committee recommended \$12.219 billion. The enacted appropriation was \$11.767 billion. (See **Table 9** for details.)

<sup>52</sup> This section was written by Daniel Morgan, Specialist in Science and Technology Policy, CRS Resources, Science, and Industry Division.

The request for the DOE Office of Science was \$5.153 billion, an increase of 11.5% from the FY2013 post-sequester appropriation of \$4.621 billion. There is no authorized funding level for the Office of Science in FY2014; the most recent authorization act (the America COMPETES Reauthorization Act of 2010, P.L. 111-358) authorized appropriations through FY2013. The House bill would have provided \$4.653 billion, an amount that the Administration stated “would eliminate all funding for new grants and likely lead to terminations of ongoing awards ... operations at all major scientific user facilities would be reduced or would cease.”<sup>53</sup> The Senate committee recommended the requested amount. The enacted appropriation was \$5.071 billion.

The Obama Administration’s previous goal of doubling the combined funding of the Office of Science and two other agencies is now “a commitment to increase funding” for those agencies.<sup>54</sup> For further discussion of the doubling goal and how it has evolved through successive Administrations and congressional action, see the section “Efforts to Double Certain R&D Accounts” above. The original target announced by the Bush Administration was to achieve the doubling in the decade from FY2006 to FY2016. The FY2014 request for the Office of Science was 42% more than its FY2006 baseline. The House and Senate committee recommendations were respectively 28% and 42% above the baseline. The enacted appropriation was 40% above the baseline.

The Office of Science includes six major research programs. The request of \$1.862 billion for the largest program, basic energy sciences (BES), was an increase of \$261 million relative to \$1.601 billion in FY2013 (post-sequester). The House bill would have provided \$1.583 billion. The Senate committee recommended \$1.805 billion. The final appropriation was \$1.713 billion. Within BES, DOE announced plans to issue a solicitation in FY2014 for new Energy Frontier Research Centers (EFRCs) and renewals of existing centers. The request included \$169 million for EFRCs, an increase intended to allow DOE to forward-fund some of the new and renewed centers. The House bill would have provided \$60 million for EFRCs. The Senate committee recommended \$100 million. The final appropriation included up to \$100 million. Also in BES, the request included funds to increase operations at existing DOE synchrotron light sources as well as \$95 million for the start of construction of the Linac Coherent Light Source II (LCLS-II). The House bill would have provided \$47.5 million for LCLS-II. The Senate committee recommended the requested \$95 million. The final appropriation was \$75.7 million. In the BES Materials Sciences and Engineering program, the request included \$8.5 million for the Experimental Program to Stimulate Competitive Research (EPSCoR). The House bill would have provided no funding for EPSCoR. The Senate committee recommended \$20 million. The final EPSCoR appropriation was \$10 million.

In the Office of Science fusion energy sciences program, the request proposed to increase the U.S. contribution to the International Thermonuclear Experimental Reactor (ITER) from \$105 million in FY2012 to \$225 million in FY2014. In 2008, the cost for the U.S. share of ITER, a multi-year international construction project, was estimated to be between \$1.45 billion and \$2.2 billion. Schedule delays, design and scope changes, and other factors have likely increased ITER

<sup>53</sup> Executive Office of the President, Office of Management and Budget, Statement of Administration Policy on H.R. 2609, July 8, 2013.

<sup>54</sup> Executive Office of the President, “The President’s Plan for Science and Innovation: Increasing Funding for Key Science Agencies in the 2014 Budget,” [http://www.whitehouse.gov/sites/default/files/microsites/ostp/2014\\_R&Dbudget\\_agencies.pdf](http://www.whitehouse.gov/sites/default/files/microsites/ostp/2014_R&Dbudget_agencies.pdf). Compare Executive Office of the President, “The President’s Plan for Science and Innovation: Doubling Funding for Key Science Agencies in the 2013 Budget,” [http://www.whitehouse.gov/sites/default/files/microsites/ostp/fy2013rd\\_doubling.pdf](http://www.whitehouse.gov/sites/default/files/microsites/ostp/fy2013rd_doubling.pdf), and similar documents in previous years.

costs and delayed formal approval of a revised cost estimate. Pending a new official estimate, DOE believes that funding of \$225 million per year will allow it to meet its international obligations, up to the achievement of ITER's intermediate "first plasma" milestone, for a total cost of \$2.4 billion. The requested increase for U.S. ITER funding in FY2014 was to be offset partially by a decrease in funding for domestic fusion activities. In particular, no FY2014 funding was requested for research or operations at the Alcator C-Mod tokamak, a fusion reactor that was shut down in FY2013. The House bill would have provided \$7.5 million less than the request for the U.S. contribution to ITER, but \$55 million more than the request for domestic fusion activities, including \$22 million for FY2014 operations and research at Alcator C-Mod. The Senate committee recommended \$183.5 million for the U.S. contribution to ITER, contingent on submission of a baseline cost, schedule, and scope estimate. The Senate committee's recommended total for fusion energy sciences was the requested amount and included no funding for Alcator C-Mod. The final appropriation for fusion energy sciences was \$506 million, including \$200 million for the U.S. contribution to ITER and \$22 million for Alcator C-Mod. The joint explanatory statement directed DOE to submit a 10-year strategic fusion plan that assumes U.S. participation in ITER and assesses funding priorities for the domestic fusion program in various budget scenarios.

The request for biological and environmental research in the Office of Science was \$625 million, up 3.8% from \$578 million in FY2013 (post-sequester). This total was divided approximately evenly between two programs: biological systems science and climate and environmental sciences. The House bill would have provided \$494 million for biological and environmental research. The House committee report stated that "the Committee continues to support the Biological Systems Science program"; it did not mention the climate and environmental sciences program. The Senate committee recommended the requested amount for both programs. The final appropriation was \$610 million. The joint explanatory statement was silent regarding the allocation of this amount between biological systems science and climate and environmental sciences.

The request for DOE national security R&D was \$3.283 billion, a 9.9% increase from \$2.987 billion in FY2013 (post-sequester). The House bill would have provided \$3.209 billion, while the Senate committee recommended \$3.398 billion. Most of the requested increase was in the Naval Reactors program. Increased funding was proposed for Naval Reactors operations and infrastructure to permit recapitalization of facilities, infrastructure, and capital equipment. Naval Reactors construction funding was to increase, and was expected to increase further in future years, as construction begins on the Spent Fuel Handling Recapitalization project. The House bill included \$93 million less than the request for Naval Reactors operations and infrastructure and did not include funding for the Spent Fuel Handling Recapitalization project. The Senate committee recommended \$66 million more than the request for Naval Reactors, with increases spread across several activities. The final appropriation for Naval Reactors was \$1.095 billion, less than in either the House or the Senate bill. This total included no funds for the Spent Fuel Handling Recapitalization project and \$99.4 million less than the request for operations and infrastructure. In the Defense Nuclear Nonproliferation account, the request of \$389 million for R&D included certain costs for nuclear detection satellites that were previously paid by the Department of Defense. The House bill would have provided the requested amount for nuclear nonproliferation R&D. The Senate committee recommended an increase of \$20 million for the development of advanced nuclear detection technologies. The final appropriation was \$399 million, an increase of \$10 million. In the Weapons Activities account, the Administration requested an increase in funding for nuclear weapons science and a decrease in funding for research on inertial confinement fusion and advanced simulation and computing. The House bill

and the Senate committee recommendation would both have increased funding for inertial confinement fusion, rather than decreasing it. Other Weapons Activities reductions in the Senate bill were largely a result of accounting changes. The final appropriation for weapons activities was \$1.672 billion; allocations within this amount were similar to the House bill.

The request for DOE energy R&D was \$4.182 billion, up 31.9% from \$3.171 billion in FY2013 (post-sequester). The House bill would have provided \$2.026 billion. The Senate committee recommendation was \$3.668 billion. The final appropriation was \$3.508 billion. The request proposed to increase funding for R&D in the Office of Energy Efficiency and Renewable Energy (EERE) by 58%, from \$1.599 billion in FY2013 (post-sequester) to \$2.528 billion in FY2014, with increases requested for most EERE programs. The House bill would have provided \$786 million and rescinded \$157 million in unobligated balances from prior years.<sup>55</sup> The Senate committee recommended \$2.034 billion. Within EERE, Advanced Manufacturing (formerly Industrial Technologies) was to receive \$365 million under the request, more than triple its FY2013 level. The Advanced Manufacturing request included \$177 million to create Clean Energy Manufacturing Innovation Institutes (consistent with the previously discussed “National Network for Manufacturing Innovation”). Other focus areas for requested funding increases in EERE included batteries and energy storage, concentrating solar power, a demonstration of commercial-scale biofuels production under the Defense Production Act,<sup>56</sup> and grid integration for energy efficient buildings. Under the House bill, nearly every EERE program would have decreased relative to FY2013, with Advanced Manufacturing (\$120 million, up about 10%) being a rare exception. The Senate committee recommended \$126 million for Advanced Manufacturing. Also in EERE, the Senate committee directed DOE to terminate the Energy Efficient Buildings Hub, which it said has shown “no measurable benefit.” The Administration’s proposed decrease of \$88 million for fossil energy R&D was mostly from the coal program. Funding for fossil energy R&D in the House bill would have been \$39 million more than the request, but would have included \$43 million less than requested for carbon capture. The Senate committee recommended the requested amount. The final appropriation was \$562 million, an increase of \$141 million above the request. That increase was directed almost entirely toward the coal program. The request for the Advanced Research Projects Agency–Energy (ARPA-E) was \$379 million, an increase of \$104 million or 38%. The House bill would have provided \$70 million for ARPA-E, including the House committee recommendation of \$50 million and a \$20 million increase provided by a floor amendment. Despite this reduction in funding, the House committee report stated that the committee “remains supportive of ARPA-E’s efforts.” The Senate committee recommended the requested amount for ARPA-E. The final appropriation was \$280 million.

<sup>55</sup> The House committee recommendation was \$811 million. Two House floor amendments reduced funding for the Renewable Energy, Energy Reliability, and Efficiency account by a total of \$25 million without specifying the activities within the account to which the reductions should apply. The figure of \$786 million given here assumes that the full \$25 million reduction would have been applied to EERE R&D, which is the largest activity in the account.

<sup>56</sup> See CRS Report R42568, *The Navy Biofuel Initiative Under the Defense Production Act*, by Anthony Andrews et al.

**Table 9. Department of Energy R&D and Related Activities**

(budget authority in millions of dollars)

	<b>FY2012 Actual</b>	<b>FY2013 Op. Plan</b>	<b>FY2014 Request</b>	<b>FY2014 House</b>	<b>FY2014 Sen. Cte.</b>	<b>FY2014 Enacted</b>
<b>Science</b>	<b>\$4,935</b>	<b>\$4,621</b>	<b>\$5,153</b>	<b>\$4,653</b>	<b>\$5,153</b>	<b>\$5,071</b>
Basic Energy Sciences	1,645	1,601	1,862	1,583	1,805	1,713
High Energy Physics	771	748	777	773	807	798
Biological and Environmental Research	592	578	625	494	625	610
Nuclear Physics	535	520	570	552	570	570
Advanced Scientific Computing Research	428	418	466	432	494	479
Fusion Energy Sciences	393	380	458	506	458	506
Other	571	376	395	313	394	396
<b>National Security</b>	<b>3,103</b>	<b>2,987</b>	<b>3,283</b>	<b>3,209</b>	<b>3,398</b>	<b>3,188</b>
Weapons Activities <sup>a</sup>	1,665	1,554 <sup>b</sup>	1,624	1,697	1,653	1,672
Naval Reactors	1,080	994	1,246	1,109	1,312	1,095
Defense Nuclear Nonproliferation R&D	348	430	389	389	409	399
Defense Environmental Cleanup Tech. Dev.	10	10	24	14	24	22
<b>Energy</b>	<b>3,121</b>	<b>3,171</b>	<b>4,182</b>	<b>2,026</b>	<b>3,668</b>	<b>3,508</b>
Energy Efficiency and Renewable Energy <sup>c</sup>	1,653	1,599	2,528	786 <sup>d</sup>	2,034	1,671
Electricity Delivery & Energy Reliability R&D	96	94	119	64	99	106
Fossil Energy R&D	337	508	421	450	421	562
Nuclear Energy	760	719	735	656	735	889
Advanced Research Projects Agency–Energy	275	251	379	70	379	280
<b>Total</b>	<b>11,159</b>	<b>10,779</b>	<b>12,618</b>	<b>9,888</b>	<b>12,219</b>	<b>11,767</b>

**Source:** FY2012 actual and FY2014 request from DOE's FY2014 congressional budget justification, <http://energy.gov/cfo/downloads/fy-2014-budget-justification>. FY2013 operating plan from personal communication between CRS and DOE, December 6, 2013. FY2014 House from H.R. 2609 as passed by the House and H.Rept. 113-135. FY2014 Senate from S. 1245 as reported and S.Rept. 113-47. FY2014 enacted from P.L. 113-76 and joint explanatory statement, *Congressional Record*, January 15, 2014, pp. H881-H893.

**Notes:** Totals may differ from the sum of the components due to rounding.

- a. Including Stockpile Services R&D Support, Stockpile Services R&D Certification and Safety, Science, Engineering except Enhanced Surety and Enhanced Surveillance, Inertial Confinement Fusion, Advanced Simulation and Computing, and National Security Applications. Additional R&D activities may take place in the subprograms of Directed Stockpile Work that are devoted to specific weapon systems, but these funds are not included in the table because detailed funding schedules for those subprograms are classified.
- b. Estimated by CRS.
- c. Excluding Weatherization and Intergovernmental Activities.
- d. Not adjusted for rescission of \$157 million in unobligated prior-year balances. House floor amendments reduced funding for Renewable Energy, Energy Reliability, and Efficiency by a total of \$25 million without specifying the activities within that account to which the reductions should apply. In this table, the full \$25 million reduction is assumed to apply to energy efficiency and renewable energy R&D, which is the account's largest activity.



## National Science Foundation<sup>57</sup>

The National Science Foundation (NSF) supports basic research and education in the non-medical sciences and engineering. Congress established the Foundation as an independent federal agency in 1950 and directed it to “promote the progress of science; to advance the national health, prosperity, and welfare; to secure the national defense; and for other purposes.”<sup>58</sup> The NSF is a primary source of federal support for U.S. university research, especially in certain fields such as mathematics and computer science. It is also responsible for significant shares of the federal science, technology, engineering, and mathematics (STEM) education program portfolio and federal STEM student aid and support.

The Consolidated Appropriations Act, 2014 provides \$7.172 billion to the NSF in FY2014. This amount is \$287.8 million (4.2%) more than the foundation’s post-sequestration, post-rescission FY2013 current plan (e.g., estimated) funding level of \$6.884 billion. The Administration initially sought \$7.626 billion in funding for the NSF in FY2014. The House Committee on Appropriations recommended a total of \$6.995 billion. The Senate Committee on Appropriations recommended a total of \$7.426 billion. Division B of the “Joint Explanatory Statement” (JES) published in the January 15, 2014, *Congressional Record* adopted House<sup>59</sup> and Senate<sup>60</sup> appropriations committee report language, unless otherwise indicated. Congress had not enacted specific FY2014 appropriations authorizations for NSF.<sup>61</sup> (For additional detail on NSF funding see **Table 10**.)

In its budget documents NSF indicated that its overarching priorities for FY2014 included the following six programs.

- *Cyber-enabled Materials, Manufacturing, and Smart Systems (CEMMSS)*—The FY2014 request was \$300.4 million, which was \$156.1 million (108.2%) more than the FY2012 actual amount of \$144.3 million.<sup>62</sup>
- *Cyberinfrastructure Framework for 21<sup>st</sup> Century Science, Engineering, and Education (CIF21)*—The FY2014 request was \$155.5 million, which was \$64.2 million (70.4%) more than the FY2012 actual amount of \$91.2 million.
- *NSF Innovation Corps (I-Corps)*—The FY2014 request was \$24.9 million, which was \$18.1 million (267.1%) more than the FY2012 actual amount of \$6.8 million.

<sup>57</sup> This section was written by Heather B. Gonzalez, Specialist in Science and Technology Policy, CRS Resources, Science, and Industry Division. Numbers are rounded. Data available upon request.

<sup>58</sup> The National Science Foundation Act of 1950 (P.L. 81-507).

<sup>59</sup> This section refers to H.Rept. 113-171, which accompanied H.R. 2787 (Commerce, Justice, Science, and Related Agencies Appropriations Bill, 2014) when it was reported from committee, as the “House report.”

<sup>60</sup> This section refers to S.Rept. 113-78, which accompanied S. 1329 (Commerce and Justice, and Science, and Related Agencies Appropriations Bill, 2014) when it was reported from committee, as the “Senate report.”

<sup>61</sup> NSF relies on its organic act for budget authority in FY2014.

<sup>62</sup> FY2014 NSF budget documents compare FY2014 requested levels with FY2012 actual levels because policymakers had not yet agreed upon FY2013 appropriations when the President submitted his FY2014 budget request to Congress.

- *Integrated NSF Support Promoting Interdisciplinary Research and Education (INSPIRE)*—The FY2014 request was \$63.0 million, which was \$33.9 million (116.5%) more than the FY2012 actual amount of \$29.1 million.
- *Science, Engineering, and Education for Sustainability (SEES)*—The FY2014 request was \$222.8 million, which was \$65.3 million (41.4%) more than the FY2012 actual amount of \$157.6 million.
- *Secure and Trustworthy Cyberspace (SaTC)*—The FY2014 request was \$110.3 million, which was \$3.1 million (2.8%) less than the FY2012 actual amount of \$113.4 million.

Since FY2006, overall increases in the NSF budget have been at least partially driven by a “doubling path policy.” Under this policy, Congress and successive Administrations have sought to double funding for the NSF, Department of Energy’s Office of Science, and National Institute of Standards and Technology’s core laboratory and construction accounts (collectively “the targeted accounts”). However, actual funding for the targeted accounts has not typically reached authorized levels. Doubling path funding authorizations ended in FY2013.<sup>63</sup> Some legislators have expressed concern about pursuing the doubling effort given the nation’s fiscal challenges, including one who urged observers “to be realistic about the notion of doubling the NSF budget.”<sup>64</sup> Other analysts have asserted that without the doubling path policy in place, funding levels for targeted accounts might have fallen over the past half-decade.<sup>65</sup> Congress had not reauthorized the doubling path policy as of the date of this report.

Congress typically appropriates to NSF at the major account level. NSF’s major accounts are Research and Related Activities (R&RA); Education and Human Resources (E&HR); Major Research Equipment and Facilities Construction (MREFC); Agency Operations and Awards Management (AOAM); National Science Board (NSB); and the Office of Inspector General (IG).<sup>66</sup>

R&RA is the largest NSF account and the primary source of research funding at the NSF.<sup>67</sup> The Consolidated Appropriations Act, 2014 provides \$5.809 billion in funding for R&RA in FY2014. This amount is \$265.2 million (4.8%) more than the post-sequestration, post-rescission FY2013 current plan funding level of \$5.544 billion. The Administration initially sought \$6.212 billion in funding for R&RA in FY2014; noting “strong support for cross-cutting research priorities such as advanced manufacturing, clean energy and sustainability, break-through materials, robotics, cyberinfrastructure, and cybersecurity.” The House Committee on Appropriations recommended \$5.676 billion for R&RA in FY2014. The Senate Committee on Appropriations recommended

<sup>63</sup> The most recent authorization levels for the targeted accounts, specified in the America COMPETES Reauthorization Act (P.L. 111-358), were for FY2011, FY2012, and FY2013.

<sup>64</sup> Opening Statement of Ranking Member Dan Lipinski, in U.S. Congress, House Committee on Science, Space, and Technology, Subcommittee on Research and Science Education, “The National Science Foundation’s FY2013 Budget Request,” hearings, 112<sup>th</sup> Cong., 2<sup>nd</sup> sess., February 28, 2012.

<sup>65</sup> Testimony of Dr. Jeffrey L. Furman, in U.S. Congress, Senate Committee on Commerce, Science, and Transportation, “Five Years of the America COMPETES Act: Progress, Challenges, and Next Steps,” hearings, 112<sup>th</sup> Cong., 2<sup>nd</sup> sess., September 19, 2012.

<sup>66</sup> Funds from major NSF accounts may be merged at the program level and in many cases NSF’s education, facilities, and research activities are deeply integrated as a matter of practice.

<sup>67</sup> For more information on historical funding trends at NSF, see CRS Report R42470, *An Analysis of STEM Education Funding at the NSF: Trends and Policy Discussion*, by Heather B. Gonzalez.



\$6.018 billion. NSF consolidated certain R&RA sub-accounts in FY2013, moving from 11 directorates and offices to 8.<sup>68</sup>

Compared to FY2012 enacted levels, the FY2014 request for R&RA included increases for all but one major sub-account.<sup>69</sup> As was the case in FY2013, the largest increase—by both amount (\$138.0 million) and percentage (34.6% more than the FY2012 level of \$398.6 million)—was in the International and Integrative Activities account (IIA), for which the Administration sought \$536.6 million in FY2014. Also as with FY2013, over half of the growth in IIA was attributable to requested increases in funding for the Graduate Research Fellowship (GRF).<sup>70</sup> The second-largest increase—by amount (\$86.6 million) and percentage (10.5% over the FY2012 level of \$824.6 million)—went to the Engineering (ENG) directorate. The Administration sought \$911.1 million for ENG in FY2014. About a third of the growth in the ENG account stemmed from requested increases for small business research programs in ENG’s Division of Industrial Innovation and Partnerships (IIP).<sup>71</sup>

With respect to R&RA, the JES accepted proposed terminations and reductions; provided the requested funding level (\$50.0 million) for the International Ocean Discovery Program; and rejected Senate report limits on OneNSF<sup>72</sup> initiatives while encouraging NSF to assess and refine the balance between OneNSF activities and core research in FY2015 and future budget years.<sup>73</sup> The House report provided \$13.9 million for new investments in cognitive science and neuroscience research, offered the requested levels for various (unspecified) R&RA advanced manufacturing proposals, and supported a temporary reduction in Antarctic research funding in order to provide funds for the implementation of certain recommended safety and management changes. Among other things, the Senate report also provided the full request for SEES (\$222.8 million).

Widely tracked programs and activities in the R&RA account include Experimental Program to Stimulate Competitive Research (EPSCoR), the Division of Astronomical Sciences (AST), and the Directorate on Social, Behavioral, and Economic Sciences (SBE). The Consolidated Appropriations Act, 2014 provides \$158.2 million for EPSCoR (about \$10 million over FY2013 current plan levels) in FY2014. The Senate report recommended the requested level (\$163.6 million); the House report did not specify. The FY2014 request for AST was \$243.6 million, or \$8.9 million (3.8%) more than the FY2012 actual level of \$234.7 million. With respect to AST, the Senate report stated that the committee “expects NSF to fully support the scientific and

<sup>68</sup> The FY2014 NSF budget request adjusts funding levels for all reported years to account for this change.

<sup>69</sup> The FY2014 NSF budget request decreases funding for the U.S. Arctic Research Commission by about -3.4%, from \$1.45 million in FY2012 to \$1.40 million in FY2014.

<sup>70</sup> The FY2014 NSF budget request seeks \$162.6 million for the R&RA contribution to the GRF. This amount is \$74.1 million (83.7%) more than the FY2012 actual R&RA funding level of \$88.5 million. E&HR also contributes to the GRF.

<sup>71</sup> The FY2014 request for IIP is \$225.5 million. This amount is \$37.7 million (20.1%) more than the FY2012 actual level of \$187.8 million. About 80% of this increase would support growth in the NSF Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) programs. For more information on these programs, see CRS Report 96-402, *Small Business Innovation Research (SBIR) Program*, by Wendy H. Schacht.

<sup>72</sup> The FY2014 budget request does not include the term “OneNSF.” However, NSF described the six programs identified as “FY2014 Priorities” in its FY2014 budget request (e.g., CEMMSS, CIF21, SEES, etc.) as “OneNSF” initiatives in its FY2013 budget request.

<sup>73</sup> The Senate report initially directed NSF to apply the \$194.0 million reduction to R&RA (from the requested level) to the OneNSF initiatives.

education activities at the Division of Astronomical Sciences,” including funding for the National Radio Astronomy Observatory at FY2012 levels and full support of instruments and facilities. The House report did not specify funding for AST. The FY2014 request for SBE was \$272.4 million. This amount was \$18.2 million, or 7.1%, more than the FY2012 actual funding level of \$254.2 million. The Consolidated Appropriations Act, 2014, JES, House report, and Senate report were silent on funding for SBE in FY2014. This marks a change from FY2013, when policymakers enacted language prohibiting NSF from funding certain SBE grants (i.e., political science) unless the foundation certified that each funded project promoted national security or the economic interest of the United States.<sup>74</sup>

The Consolidate Appropriations Act, 2014 provides \$846.5 million to E&HR in FY2014. This amount is \$13.2 million more than the FY2013 post-sequestration, post-rescission level of \$833.3 million. E&HR is the primary source of funding for science, technology, engineering, and mathematics (STEM) education at the NSF. The House Committee on Appropriations recommended \$825.0 million for E&HR in FY2014. The Administration requested, and the Senate Committee on Appropriations recommended, \$880.3 million. Approximately 44.0% of the FY2014 E&HR request would have supported R&D activities. E&HR funding for R&D has been increasing. In FY2010, FY2011, and FY2012 (all actual) the percentage of E&HR funding that supported R&D was 13.7%, 25.9%, and 30.3%, respectively.

As mentioned earlier in “Reorganization of STEM Education Programs,” the Administration proposed a reorganization and consolidation of many federal STEM education programs in FY2014.<sup>75</sup> Under the Administration’s plan, NSF would have played a leadership role in the federal undergraduate and graduate STEM education efforts. (The Department of Education and Smithsonian Institution would have focused on K-12 education and informal STEM education, respectively.) The foundation’s FY2014 budget request highlighted several NSF changes associated with the plan. These included establishment of the Catalyzing Advances in Undergraduate STEM Education (CAUSE) program;<sup>76</sup> expansion of the GRF such that it would become a primary source for all federal research fellowships; and the creation of the NSF Research Traineeship (NRT), which would have replaced the Integrative Graduate Education Research Traineeship (IGERT). It was unclear how the expansion of the GRF—which was to become the National Graduate Research Fellowship (NGRF)—would have affected the availability of fellowships for mission-driven research at other federal science agencies. The Administration sought \$123.1 million in funding for CAUSE, \$325.1 million for the NGRF, and \$55.1 million for the NRT in FY2014.

The JES and House and Senate appropriations committee reports rejected the proposed reorganization plan, except as specifically noted. The JES further directs the Office of Science and Technology Policy (OSTP) to reexamine other possible reorganizations of the federal STEM education effort “after engaging in an inclusive development process (involving the interagency community and major external stakeholders).” The Senate report deferred action on the reorganization until OSTP finalizes STEM education program assessments as required by the

<sup>74</sup> More information about this limitation is available on the Political Science program website, [http://www.nsf.gov/funding/pgm\\_summ.jsp?pims\\_id=5418](http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=5418).

<sup>75</sup> Although the details of the plan appear to be in flux, the Administration proposes reducing the number of federal STEM education programs by about 50% and shifting approximately \$180.0 million in budget authority from various federal agencies to the NSF, Department of Education, and Smithsonian Institution. Some programs within the three receiving agencies would also be consolidated, as would STEM education programs at other federal agencies.

<sup>76</sup> The CAUSE program would consolidate three E&HR programs, three R&RA programs, and one NSF-wide program.

America COMPETES Reauthorization Act of 2010 (P.L. 111-358). The Senate report also asked NSF to work with OSTP to determine “how NSF could implement a broader program for graduate and undergraduate programs across the entire Federal Government, and to identify which programs across Government could benefit from such a program.”<sup>77</sup> The House report specifically rejected the establishment of the CAUSE program or the transition to a federal government-wide GRF program.

Other accounts that fund R&D at the NSF include the Major Research Equipment and Facilities Construction (MREFC) account. MREFC received \$200.0 million in FY2014. This amount is about \$4 million more than the FY2013 post-sequestration, post-rescission funding level of \$196.2 million. The FY2014 request for the MREFC account was \$210.1 million. FY2014 funding was to provide a final year of support for the Advanced Interferometer Gravitational-Wave Observatory and Ocean Observatories Initiative, as well as the first year of funding for the Large Synoptic Survey Telescope (LSST). Funding for the Advanced Technology Solar Telescope and National Ecological Observatory Network would continue. The House report provided an amount (\$182.6 million) that was equal to the request for continuing projects, but would not have covered costs of the first year of construction for the LSST. The Senate report provided the requested level and welcomed the start of LSST construction. The JES specifies that FY2014 MREFC funding includes the requested levels for on-going projects, as well as initial funding for the LSST. The JES authorizes NSF to submit a transfer proposal if additional funds are necessary for the LSST in FY2014.

The Consolidated Appropriations Act, 2014 provided \$298.0 million, \$4.3 million, and \$14.2 million (respectively) for AOAM, NSB, and OIG in FY2014. The Administration sought \$304.3 million, \$4.5 million, and \$14.3 million (respectively) for these accounts in FY2014.

The FY2014 NSF budget request also included funding for three multi-agency initiatives: National Nanotechnology Initiative (NNI, \$430.9 million), Networking and Information Technology Research and Development (NITRD, \$1.227 billion), and U.S. Global Change Research Program (USGCRP, \$326.4 million).

**Table 10. NSF Funding by Major Account**  
(budget authority in millions of dollars)

<b>Account</b>	<b>FY2013 Current Plan<sup>a</sup></b>	<b>FY2014 Request</b>	<b>FY2014 House Committee</b>	<b>FY2014 Senate Committee</b>	<b>FY2014 Enacted</b>
<i>Biological Sciences</i>	\$678.9	\$760.6	<i>n/a</i>	<i>n/a</i>	<i>n/a</i>
<i>Computer and Information Science and Engineering<sup>b</sup></i>	858.5	950.3	<i>n/a</i>	<i>n/a</i>	<i>n/a</i>
<i>Engineering</i>	813.5	911.1	<i>n/a</i>	<i>n/a</i>	<i>n/a</i>
<i>Geosciences<sup>b</sup></i>	1,265.8	1393.9	<i>n/a</i>	<i>n/a</i>	<i>n/a</i>
<i>Mathematical and Physical Sciences</i>	1,249.5	1386.1	<i>n/a</i>	<i>n/a</i>	<i>n/a</i>
<i>Social, Behavioral, and Economic Sciences</i>	242.5	272.4	<i>n/a</i>	<i>n/a</i>	<i>n/a</i>

<sup>77</sup> S.Rept. 113-78, p. 124.

Account	FY2013 Current Plan <sup>a</sup>	FY2014 Request	FY2014 House Committee	FY2014 Senate Committee	FY2014 Enacted
<i>International and Integrative Activities<sup>b</sup></i>	433.5	536.6	n/a	n/a	n/a
<i>U.S. Arctic Research Commission</i>	1.4	1.4	n/a	n/a	n/a
<b>Research and Related Activities, Total</b>	<b>\$5,543.7</b>	<b>\$6,212.3</b>	<b>\$5,676.2</b>	<b>\$6,018.3</b>	<b>\$5,808.9</b>
Education and Human Resources	833.3	880.3	825.0	880.3	846.5
Major Research Equipment and Facilities Construction	196.2	210.1	182.6	210.1	200.0
Agency Operations and Award Management	293.6	304.3	294.0	298.4	298.0
National Science Board	4.1	4.5	4.1	4.5	4.3
Office of the Inspector General	13.2	14.3	13.2	14.3	14.2
<b>NSF, Total</b>	<b>\$6,884.1</b>	<b>\$7,625.8</b>	<b>\$6,995.1</b>	<b>\$7,425.9</b>	<b>\$7,171.9</b>

**Source:** Numbers in the “FY2013 Current Plan” column are from the NSF Current Plan, posted on the NSF website on April 9, 2013, and available at [http://www.nsf.gov/about/congress/113/highlights/cu13\\_0409.jsp](http://www.nsf.gov/about/congress/113/highlights/cu13_0409.jsp). Numbers in the “FY2014 Request” column are from the FY2014 *NSF Budget Request to Congress*. Numbers in the columns titled, “FY2014 House Cte.” and “FY2014 Senate Cte.” are from House and Senate committee reports on Commerce, Justice, Science, and Related Agencies funding for FY2014, respectively. Numbers in the column titled, “FY2014 Final” are from H.R. 3547 (Consolidated Appropriations Act, 2014).

**Notes:** The term “n/a” means not available. Numbers are rounded. Totals may differ from the sum of the components due to rounding.

- FY2013 NSF current plan estimates include reductions required by the sequester and by applicable rescissions in P.L. 113-6 (Consolidated and Further Continuing Appropriations Act, 2013).
- On September 7, 2012, NSF announced that it was realigning the Research and Related Activities account. Under the new account structure, the Office of Cyberinfrastructure became a division within the Directorate for Computer and Information Science and Engineering and the Office of Polar Programs became a division within the Geosciences directorate. The offices of International Science and Engineering and Integrative Activities have merged to become the Office of International and Integrative Activities.

## National Aeronautics and Space Administration<sup>78</sup>

The Administration requested \$16.516 billion for NASA R&D in FY2014. This amount was 6.5% more than the \$15.504 billion in NASA's operating plan for FY2013.<sup>79</sup> The House committee recommended \$15.397 billion. The Senate committee recommended \$16.794 billion. The final appropriation was \$16.445 billion. For a breakdown of these amounts, see **Table 11**. There is no authorized level for NASA funding in FY2014; the most recent authorization act (the NASA Authorization Act of 2010, P.L. 111-267) authorized appropriations through FY2013. Bills that would authorize FY2014 appropriations for NASA include H.R. 2687, H.R. 2616, and S. 1317.

The FY2014 request for Science was \$5.018 billion, a 4.9% increase from the FY2013 operating plan. The House and Senate committees recommended \$4.781 billion and \$5.154 billion respectively. In Planetary Science, the request included \$40.5 million for observation of near-Earth objects and \$50 million for management of a Department of Energy (DOE) program to produce plutonium-238, which some spacecraft use for power generation. In previous years, congressional policymakers disagreed about whether NASA or DOE should fund DOE production of plutonium-238 for NASA. The House and Senate committee recommendations for Planetary Science were respectively \$1.315 billion and \$1.318 billion. Among other differences relative to the request, the House committee recommended increases for exploration of Mars and the outer planets and no funding for plutonium-238 production. The Senate committee's recommended increase was entirely for Mars exploration. The final appropriation for Planetary Science was \$1.345 billion. This total included increases for exploration of Mars and the outer planets and up to the requested amount for plutonium-238 production. In Earth Science, the request included \$30 million to begin development of future land imaging capabilities to replace the current Landsat satellites, operated by the U.S. Geological Survey, as well as funds to assume responsibility for certain Earth-observing satellite instruments previously held by the National Oceanographic and Atmospheric Administration (NOAA). The House committee recommended \$1.659 billion for Earth Science, and its report stated that no funds should be spent on the proposed Landsat and NOAA-related activities. The Senate committee recommended approximately the requested amount for Earth Science, including the requested funds for land imaging, but its report expressed concern about the Administration's approach and directed NASA to submit a plan for implementing future Landsat satellites at substantially lower cost. The final appropriation for Earth Science was \$1.826 billion. The explanatory statement took the Senate report's position on land imaging and directed NASA to submit a plan to Congress before expending funds on some of the disputed sensors for NOAA. The request for the James Webb Space Telescope (JWST) was \$658.2 million. NASA expects FY2014 to be the peak funding year for JWST and states that the budget and schedule for the JWST program remain consistent with the 2011 revised plan. In the FY2012 appropriations conference report, Congress capped the formulation and development cost of JWST and mandated annual reports on the program by the Government Accountability Office. The House committee recommended \$584.0 million for JWST in FY2014, while the Senate committee recommended the requested amount. The final appropriation was the requested amount.

<sup>78</sup> This section was written by Daniel Morgan, Specialist in Science and Technology Policy, CRS Resources, Science, and Industry Division.

<sup>79</sup> Based on the August 29, 2013, NASA operating plan, which reflected numerous changes to the enacted FY2013 amounts as the result of rescissions, sequestration, transfers, and reprogramming.

The request for Aeronautics was \$565.7 million, a 6.8% increase from the FY2013 operating plan. The request for Integrated Systems Research included a new program on advanced composite materials and structures. In the Fundamental Aeronautics program, NASA planned to explore options for the future of its rotorcraft research; this planning was to be coordinated with other government agencies and industry partners. The House committee recommended \$566.0 million for Aeronautics, while the Senate committee recommended \$558.7 million. The final appropriation was \$566.0 million.

For Space Technology, the Administration requested \$742.6 million, a 20.8% increase from the FY2013 operating plan. The requested increase was to support existing projects that are moving from the planning and design phase to the more expensive tasks of hardware manufacture and demonstration. The request also included funds to accelerate the development of high-power solar electric propulsion technology for future spacecraft. The House and Senate committee recommendations were respectively \$576.0 million and \$670.1 million. The final appropriation was \$576.0 million.

The Administration's request for Exploration in FY2014 was \$3.916 billion, an increase of 5.7% from the FY2013 operating plan. This account funds development of the Orion Multipurpose Crew Vehicle (MPCV) and the Space Launch System (SLS) heavy-lift rocket, which were mandated by the 2010 authorization act for human exploration beyond Earth orbit. The account also funds development of a commercial crew transportation capability for future U.S. astronaut access to the International Space Station. Relative to the FY2013 operating plan, the request of \$821.4 million for commercial crew was an increase of 56.5%, while the request of \$2.730 billion for Orion, the SLS, and related ground systems (known collectively as Exploration Systems Development) was a decrease of 5.3%. As in previous years, this apparent difference in human spaceflight priorities between Congress and the Administration was controversial. According to NASA, the amounts requested were consistent with the planned schedules for both Orion/SLS and commercial crew. NASA officials stated that the request for commercial crew was necessary to make commercial crew transportation services available in 2017, while the request for Orion and SLS was sufficient for an uncrewed flight of the SLS in 2017 and a crewed flight in 2021. The House committee recommended \$3.612 billion, including \$500 million for commercial crew and \$2.825 billion for Exploration Systems Development. The Senate committee recommended \$4.209 billion, including \$775 million for commercial crew and \$3.118 billion for Exploration Systems Development. The final appropriation was \$4.113 billion, including \$696 million for commercial crew and \$3.115 billion for Exploration Systems Development.

The request for the International Space Station (ISS) was \$3.049 billion, an increase of 9.8% from the FY2013 operating plan. The ISS account includes the cost of commercial cargo flights for ISS resupply. The first such flight was in May 2012. A second provider launched its first flight in January 2014. The House committee recommended \$2.860 billion. The Senate committee recommended the requested amount. The final appropriation was approximately \$2.955 billion.<sup>80</sup>

NASA has proposed a mission to capture a small asteroid robotically, redirect it into orbit around the Moon, and explore it with astronauts as one of the first destinations for Orion and the SLS. The FY2014 budget request included initial funding for this mission in three different accounts: \$20 million in Science for identification and characterization of a suitable asteroid, \$45 million in Exploration for mission definition and planning and development of capture mechanisms, and

<sup>80</sup> CRS estimate. See notes to **Table 11** for explanation.



\$40 million in Space Technology for development of the solar electric propulsion technology that would be used to redirect the asteroid's orbit. The House report called the proposed asteroid mission "premature" and stated that the House committee's recommendation "does not include any of the requested increases associated with the asteroid retrieval proposal." The Senate report was silent about this mission. Noting that the proposed mission was "still an emerging concept," the joint explanatory statement stated that "NASA has not provided Congress with satisfactory justification materials," and additional groundwork "is needed ... prior to NASA and Congress making a long-term commitment to this mission concept."

**Table 11. NASA R&D**  
(budget authority in millions of dollars)

	<b>FY2012 Actual</b>	<b>FY2013 Op. Plan</b>	<b>FY2014 Request</b>	<b>FY2014 House Cte.</b>	<b>FY2014 Senate Cte.</b>	<b>FY2014 Enacted</b>
Science	\$5,073.7	\$4,781.6	\$5,017.8	\$4,781.0	\$5,154.2	\$5,151.2
<i>Earth Science</i>	1,760.5	1,659.2	1,846.1	1,659.0	1,846.2	1,826.0
<i>Planetary Science</i>	1,501.4	1,271.5	1,217.5	1,315.0	1,317.6	1,345.0
<i>Astrophysics</i>	648.4	617.0	642.3	622.0	678.4	668.0
<i>James Webb Space Telescope</i>	518.6	627.6	658.2	584.0	658.2	658.2
<i>Heliophysics</i>	644.8	606.3	653.7	601.0	653.8	654.0
Aeronautics	569.4	529.5	565.7	566.0	558.7	566.0
Space Technology	573.7	614.5	742.6	576.0	670.1	576.0
Exploration	3,707.3	3,705.5	3,915.5	3,612.0	4,209.3	4,113.2
<i>Exploration Systems Development</i>	3,001.6	2,883.8	2,730.0	2,825.0	3,118.2	3,115.2
<i>Commercial Spaceflight</i>	406.0	525.0	821.4	500.0	775.0	696.0
<i>Exploration R&amp;D</i>	299.7	296.7	364.2	287.0	316.1	302.0
International Space Station	2,789.9	2,775.9	3,049.1	2,860.0	3,049.1	2,955.4 <sup>a</sup>
<b>Subtotal R&amp;D</b>	<b>12,714.0</b>	<b>12,407.0</b>	<b>13,290.7</b>	<b>12,395.0</b>	<b>13,641.4</b>	<b>13,361.8</b>
Non-R&D Programs <sup>b</sup>	1,568.5	1,100.6	965.0	967.3	988.4	976.7
Cross-Agency Support	2,993.9	2,711.0	2,850.3	2,711.0	2,793.6	2,793.0
<i>Associated with R&amp;D<sup>c</sup></i>	2,665.1	2,490.1	2,657.4	2,514.8	2,604.9	2,602.8
Construction & Environmental C&R	494.5	660.9 <sup>a</sup>	609.4	525.0	586.9	515.0
<i>Associated with R&amp;D<sup>c</sup></i>	440.2	607.0	568.1	487.0	547.2	479.9
<b>Total R&amp;D</b>	<b>15,819.3</b>	<b>15,504.1</b>	<b>16,516.2</b>	<b>15,396.7</b>	<b>16,793.5</b>	<b>16,444.5</b>
<b>Total NASA</b>	<b>17,770.0</b>	<b>16,879.5</b>	<b>17,715.4</b>	<b>16,598.3</b>	<b>18,010.3</b>	<b>17,646.5</b>

**Sources:** FY2012 actual and FY2014 request from NASA's FY2014 congressional budget justification, <http://www.nasa.gov/news/budget/>. FY2013 operating plan as of August 29, 2013, from [http://www.nasa.gov/sites/default/files/files/FY13\\_op\\_plan\\_info\\_082913Aug.pdf](http://www.nasa.gov/sites/default/files/files/FY13_op_plan_info_082913Aug.pdf), and personal communication between CRS and NASA, February 7, 2014. FY2013 House Committee from H.R. 2787 as reported and H.Rept. 113-171. FY2014 Senate Committee from S. 1329 as reported and S.Rept. 113-78. FY2014 enacted from P.L. 113-76 and joint explanatory statement, *Congressional Record*, January 15, 2014, pp. H515-H517.

**Notes:** Totals may differ from the sum of the components due to rounding.

- a. Estimated by CRS. The act and the explanatory statement do not specify the share of the Space Operations account that is to be spent on the International Space Station. This estimate assumes a percentage share that is the average of the percentage shares specified in the House and Senate reports.

- b. Space Shuttle, Space and Flight Support, Education, and Inspector General.
- c. Allocation between R&D and non-R&D is estimated by CRS in proportion to the underlying program amounts in order to allow calculation of a total for R&D. The Cross-Agency Support and Construction and Environmental Compliance and Remediation accounts consist mostly of indirect costs for other programs, assessed in proportion to their direct costs.
- d. Includes \$14.25 million in supplemental funding appropriated by P.L. 113-2, not shown in the operating plan.

## Department of Commerce

### National Institute of Standards and Technology<sup>81</sup>

The National Institute of Standards and Technology (NIST) is a laboratory of the Department of Commerce with a mandate to increase the competitiveness of U.S. companies through appropriate support for industrial development of precompetitive, generic technologies and the diffusion of government-developed technological advances to users in all segments of the American economy. NIST research also provides the measurement, calibration, and quality assurance techniques that underpin U.S. commerce, technological progress, improved product reliability, manufacturing processes, and public safety.

In his FY2014 budget, the President requested \$928.2 million for NIST, including \$693.7 million for research and development in the STRS account, \$153.1 million for the Manufacturing Extension Partnership (MEP) program, \$21.4 million for the Advanced Manufacturing Technology Consortia (AMTech), and \$60.0 million for construction.

In January 2014, Congress passed and the President signed the Consolidated Appropriations Act, 2014 (P.L. 113-76) providing funding for all federal departments and agencies for FY2014. Prior to the enactment of P.L. 113-76, two continuing resolutions (P.L. 113-46 and P.L. 113-73) provided FY2014 funding for NIST and other federal departments and agencies.

P.L. 113-76 provides a total of \$850.0 million for NIST for FY2014, up \$80.6 million (10.5%) from the FY2013 level and down \$78.3 million (8.4%) from the President's request.<sup>82</sup> NIST funding includes \$651.0 million for research and development in the Scientific and Technical Research and Services (STRS) account, \$71.2 million (12.3%) above the FY2013 level and \$42.7 million (6.2%) below the request. The Industrial Technology Services (ITS) account received \$143.0 million for FY2014, up \$9.4 million (7.0%) from FY2013, but \$31.5 million below the request. ITS funding included \$128 million for the Manufacturing Extensions Partnership (MEP) program (\$8.6 million (7.2%) above the FY2013 level; \$25.1 million (16.4%) below the request) and \$15 million for the Advanced Manufacturing Technology Consortia (AMTech) (\$0.8 million (5.6%) above the FY2013 level; \$6.4 million (29.9%) below the request). The Construction of Research Facilities (CRF) account received \$56.0 million for FY2014, the same as in FY2013 and \$4 million (6.7%) below the request.

<sup>81</sup> This section was originally written by Wendy H. Schacht, Specialist in Science and Technology Policy, CRS Resources, Science, and Industry Division. It has been subsequently updated by John F. Sargent, Jr., Specialist in Science and Technology Policy, CRS Resources, Science, and Industry Division.

<sup>82</sup> All references to FY2013 funding for NIST include reductions for rescissions and the sequester.

The House Committee on Appropriations report accompanying H.R. 2787 recommended funding NIST at \$784.0 million, 15.5% below the budget request. The \$609.0 million provided for the STRS account was 12.2% less than the Administration's proposal, while the \$120.0 million for MEP was 21.6% below the President's figure. No funding was provided for AMTech. The \$55.0 million for construction was 8.3% less than the budget request.

The Senate Committee on Appropriations report to accompany S. 1329 included \$947.5 million for NIST, 2.1% more than proposed by the President. Funding for the STRS account would have amounted to \$703.0 million, 1.3% higher than the budget request. Support for MEP would have totaled \$153.1 million, the same as the Administration's proposal; however, the \$31.4 million for AMTech represented a 46.7% increase over the President's recommendation. The \$60.0 million for construction was identical to the budget request.

In addition to the appropriations included in the budget proposal that were to be addressed through the annual appropriations process, the Administration included two new programs that were to be funded through mandatory appropriations (spending that is typically "provided in permanent or multi-year appropriations contained in the authorizing law, and therefore, the funding becomes available automatically each year, without legislative action by Congress").<sup>83</sup> According to the budget request, NIST would have received \$100 million generated by the proceeds of the spectrum auction to "conduct public safety R&D" as part of the Wireless Innovation (WIN) Fund (under provisions of the Middle Class Tax Relief and Job Creation Act of 2012). The President also proposed \$1.000 billion in support for the establishment of a National Network for Manufacturing Innovation (NNMI).<sup>84</sup> P.L. 113-76 does not provide funding for either the WIN Fund or the NNMI.

NIST's extramural programs (currently the Manufacturing Extension Partnership and AMTech), which are directed toward increased private sector commercialization, have been a source of contention. Some Members of Congress have expressed skepticism over a "technology policy" based on providing federal funds to industry for the development of "pre-competitive generic" technologies. This approach, coupled with pressures to balance the federal budget, has led to proposals for the elimination of these activities. In 2007, the Advanced Technology Program was terminated and replaced by the Technology Innovation Program which operated until support was withdrawn in the final FY2012 appropriation.<sup>85</sup>

Increases in spending for NIST laboratories that perform the research essential to the mission responsibilities of the agency have tended to remain small. As part of the American Competitiveness Initiative, announced by former President Bush in the 2006 State of the Union address, the Administration stated its intention to double funding over 10 years for "innovation-enabling research" done, in part, at NIST through its "core" programs (defined as the STRS account and the construction budget). In April 2009, President Obama indicated his decision to double the budget of key science agencies, including NIST, over the next 10 years. In President Obama's FY2011 budget the timeframe for doubling slipped to 11 years; his FY2012 budget was

<sup>83</sup> See CRS Report RL33074, *Mandatory Spending Since 1962*, by Mindy R. Levit and D. Andrew Austin.

<sup>84</sup> For additional information on the National Network for Manufacturing Innovation, see CRS Report R42625, *The Obama Administration's Proposal to Establish a National Network for Manufacturing Innovation*, by John F. Sargent Jr.

<sup>85</sup> For additional information on the MEP and TIP programs, see CRS Report RS22815, *The Technology Innovation Program*, by Wendy H. Schacht.

intentionally silent on a timeframe for doubling. There is no mention of doubling or a timeframe in the FY2014 budget request.

**Table 12. NIST**  
(in millions of dollars)

NIST Program	FY2013 Enacted <sup>a</sup>	FY2014 Request	FY2014 House Committee	FY2014 Senate Committee	FY2014 Enacted
Scientific and Technical Research and Services	579.8	693.7	609.0	703.0	651.0
Industrial Technology Services	133.6	174.5	120.0	184.5	143.0
<i>Technology Innovation Program</i>	0	0	0	0	0
<i>Manufacturing Extension Partnership</i>	119.4	153.1	120.0	153.1	128.0
<i>Baldrige Program</i>	0	0	0	0	0
<i>AMTech</i>	14.2	21.4	0	31.4	15.0
Construction	56.0	60.0	55.0	60.0	56.0
<b>NIST Total</b>	<b>769.4</b>	<b>928.2</b>	<b>784.0</b>	<b>947.5</b>	<b>850.0</b>
<b>Mandatory Appropriations</b>					
National Network for Manufacturing Innovation	0	1,000.0	0	0	0

**Sources:** NIST website (available at [http://www.nist.gov/public\\_affairs/budget/index.cfm](http://www.nist.gov/public_affairs/budget/index.cfm)), P.L. 113-6, Administration's FY2014 Budget Request, H.Rept. 113-171, and S.Rept. 113-78, and P.L. 113-76.

**Note:** Totals may differ from the sum of the components due to rounding.

- a. FY2013 Consolidated and Further Continuing Appropriations Act of 2013 (P.L. 113-6). FY2013 amounts reflect the 1.877% rescission, 0.2% rescission, and the 5% sequester applied to 2013 annualized CR level.

## National Oceanic and Atmospheric Administration<sup>86</sup>

The Commerce Department's National Oceanic and Atmospheric Administration (NOAA) conducts scientific research in areas such as ecosystems, climate, global climate change, weather, and oceans; supplies information on the oceans and atmosphere; and manages coastal and marine organisms and environments. NOAA was created in 1970 by Reorganization Plan No. 4.<sup>87</sup> The reorganization was intended to unify elements of the nation's environmental activities and to provide a systematic approach for monitoring, analyzing, and protecting the environment.

NOAA's R&D efforts focus on three areas: climate; weather and air quality; and ocean, coastal, and Great Lakes resources. NOAA's R&D efforts support the four long-term goals of NOAA's

<sup>86</sup> This section was written by Harold F. Upton, Analyst in Natural Resources Policy, CRS Resources, Science, and Industry Division.

<sup>87</sup> "Reorganization Plan No. 4 of 1970," 35 *Federal Register* 15627-15630, October 6, 1970; also, see <http://www.lib.noaa.gov/noaainfo/heritage/ReorganizationPlan4.html>.

Next Generation Strategic Plan: (1) climate adaptation and mitigation, (2) weather-ready nation,<sup>88</sup> (3) healthy oceans, and (4) resilient coastal communities and economies.<sup>89</sup>

For FY2014, President Obama requested \$733.0 million in R&D funding for NOAA, a 35.0% increase in funding from the FY2013 enacted level of \$543.0 million. R&D accounted for 13.5% of NOAA's total FY2014 discretionary budget request of \$5.440 billion. The R&D request consisted of \$503.9 million for research (68.7%), \$65.7 million for development (9.0%), and \$163.4 million for R&D equipment (22.3%). Excluding equipment, about \$393 million (68.9%) of the R&D request would have funded intramural programs and \$177 million (31.1%) would have funded extramural programs.<sup>90</sup>

NOAA's administrative structure has five line offices that reflect its diverse mission: National Ocean Service (NOS); National Marine Fisheries Service (NMFS); National Environmental Satellite, Data, and Information Service (NESDIS); National Weather Service (NWS); and Office of Oceanic and Atmospheric Research (OAR). In addition to NOAA's five line offices, Program Support (PS), a cross-cutting budget activity, includes the Office of Marine and Aviation Operations (OMAO).

OAR is the primary center for R&D within NOAA. In FY2013, OAR accounted for 61.9% of NOAA's R&D funding. The President's FY2014 request would have provided OAR with \$438.7 million in R&D funding which is 59.9% of total R&D funding requested by NOAA and 92.9% of OAR's total budget request of \$472.4 million.

**Table 13** provides R&D funding levels by line office for FY2012, FY2013, and the FY2014 request.<sup>91</sup> On July 18, 2013, the Senate Committee on Appropriations reported S. 1329, and on July 23, 2013, the House Committee on Appropriations reported H.R. 2787. The appropriations bills, accompanying committee reports, and the final Consolidated Appropriations Act, 2014 do not specify the R&D funding levels for NOAA, but total agency and OAR funding have been provided in **Table 13** for context.

<sup>88</sup> According to NOAA a weather-ready nation is envisioned as a society that is prepared for and responds to weather-related events.

<sup>89</sup> National Oceanic and Atmospheric Administration, *National Oceanic and Atmospheric Administration FY2014 Budget Summary*, National Oceanic and Atmospheric Administration, Washington, DC, April 2013, [http://www.corporateservices.noaa.gov/nbo/fy14\\_bluebook/FINALnoaaBlueBook\\_2014\\_Web\\_Full.pdf](http://www.corporateservices.noaa.gov/nbo/fy14_bluebook/FINALnoaaBlueBook_2014_Web_Full.pdf).

<sup>90</sup> National Oceanic and Atmospheric Administration, *National Oceanic and Atmospheric Administration FY2014 Budget Summary*, National Oceanic and Atmospheric Administration, Washington, DC, April 2013, [http://www.corporateservices.noaa.gov/nbo/fy14\\_bluebook/FINALnoaaBlueBook\\_2014\\_Web\\_Full.pdf](http://www.corporateservices.noaa.gov/nbo/fy14_bluebook/FINALnoaaBlueBook_2014_Web_Full.pdf).

<sup>91</sup> Stacy Denney, NOAA Budget Office, e-mail, August 7, 2013.

**Table 13. NOAA R&D**

(in millions of dollars)

Line Offices	FY2012 Enacted	FY2013 Enacted <sup>a</sup>	FY2014 Request	FY2014 House Committee	FY2014 Senate Committee	FY2014 Enacted
National Ocean Service	62.4	62.2	83.9	n/a	n/a	n/a
National Marine Fisheries Service	53.6	32.4	51.3	n/a	n/a	n/a
Office of Oceanic and Atmospheric Research	338.6	336.1	438.7	n/a	n/a	n/a
National Weather Service	22.5	24.3	40.2	n/a	n/a	n/a
National Environmental Satellite, Data, and Information Service	26.7	25.1	27.0	n/a	n/a	n/a
Office of Marine and Aviation Operations <sup>b</sup>	69.6	62.8	91.9	n/a	n/a	n/a
<b>Total R&amp;D</b>	<b>573.4</b>	<b>543.0</b>	<b>733.0</b>	<b>n/a</b>	<b>n/a</b>	<b>n/a</b>
<b>Total OAR</b>	<b>382.8</b>	<b>369.4</b>	<b>472.4</b>	<b>358.5</b>	<b>456.5</b>	<b>426.8</b>
<b>NOAA Total</b>	<b>4,893.7</b>	<b>4,747.8</b>	<b>5,439.7</b>	<b>4,915.5</b>	<b>5,589.7</b>	<b>5,314.6</b>

**Sources:** Stacy Dennery, NOAA Budget Office, e-mail concerning NOAA R&D, August 7, 2013; NOAA Budget Office, e-mail concerning the FY2013 Spend Plan, July 22, 2013.

**Notes:** Totals may differ from the sum of the components due to rounding. n/a = not available.

a. From the NOAA Spend Plan after rescissions and sequestration were applied.

b. All OMAO R&D funding is for equipment.

## Department of Agriculture<sup>92</sup>

U.S. Department of Agriculture (USDA) research and education activities are administered in four of its agencies: Agricultural Research Service (ARS), National Institute of Food and Agriculture (NIFA),<sup>93</sup> Economic Research Service (ERS), and National Agricultural Statistics Service (NASS). The Administration's FY2014 budget request for activities under USDA's Research, Education, and Economics (REE) mission area was \$2.81 billion, up from \$2.40 billion in FY2013 (post-sequestration). (See **Table 14**.) When referring to the Administration's request, Secretary of Agriculture Tom Vilsack stated that

[A]gricultural research is a proven investment. It is important to increase our investment in research and education, which has proven to be a powerful strategy to boost farm productivity, and has contributed to creation of jobs and enhancing rural economies. As farmers and ranchers face challenges from more frequent and more intense extreme weather

<sup>92</sup> This section was written by Dennis A. Shields, Specialist in Agricultural Policy, CRS Resources, Science, and Industry Division.

<sup>93</sup> NIFA was formerly the Cooperative State Research, Education, and Extension Service (CSREES).



conditions, we are focused on providing best practices and workable strategies to adapt to the changes and mitigate the impact.<sup>94</sup>

For the combined appropriations, the House and Senate committees recommended \$2.51 billion and \$2.64 billion, respectively. The omnibus appropriations act (P.L. 113-76) provided \$2.64 billion for the REE mission area, the highest level since FY2010 when it was \$2.84 billion.

The Agricultural Research Service is USDA's in-house basic and applied research agency, and operates approximately 90 laboratories nationwide. ARS also includes the National Agricultural Library, a primary information resource on food, agriculture, and natural resource sciences. ARS laboratories focus on efficient food and fiber production, development of new products and uses for agricultural commodities, development of effective controls for pest management, and support of USDA regulatory and technical assistance programs.

The President requested \$1.28 billion for ARS in FY2014, \$262 million above the FY2013 enacted level (post-sequestration). The House and Senate committees recommended \$1.07 billion and \$1.12 billion, respectively. The omnibus appropriations act provided \$1.12 billion for FY2014.

The FY2014 request proposed \$155 million to replace the agency's Southeast Poultry Disease Research Laboratory in Athens, GA. The request would have fully funded only this single facility rather than making smaller upgrades across multiple facilities. The President also requested funding for additional research to increase the economic value of biorefinery co-products, for example, while proposing to eliminate lower priority extramural projects (particularly for research carried out by other institutions) and to close six selected laboratories. Funding from proposed discontinued ARS projects would be redirected to agency research priorities such as enhanced floral and nursery research, improved feed efficiency and reduced antimicrobial resistance in livestock, and food safety. In the explanatory statement for the FY2014 consolidated appropriations act, Congress did not accept the President's budget request regarding the termination of extramural research, reallocation of funds, or closure of six research locations.

The National Institute of Food and Agriculture was established in Title VII, Section 7511 of the Food, Conservation, and Energy Act of 2008 (P.L. 110-246, also known as the 2008 farm bill). NIFA is responsible for developing partnerships between the federal and state components of agricultural research, extension, and institutions of higher education. NIFA distributes funds to State Agricultural Experiment Stations, State Cooperative Extension Systems, land-grant universities, and other institutions and organizations that conduct agricultural research, education, and outreach. Included in these partnerships is funding for research at 1862 land-grant institutions, 1890 historically black colleges and universities, 1994 tribal land-grant colleges, and Hispanic-serving institutions.<sup>95</sup> Funding is distributed to the states through competitive awards, statutory formula funding, and special grants.

---

<sup>94</sup> U.S. Department of Agriculture, "Statement by Thomas J. Vilsack, Secretary of Agriculture, Before the Subcommittee on Agriculture, Rural Development, Food and Drug Administration, and Related Agencies, Committee on Appropriations, U.S. House of Representatives," April 16, 2013, <http://appropriations.house.gov/uploadedfiles/hhrg-113-ap01-wstate-vilsack-20130416.pdf>.

<sup>95</sup> The numbers 1862, 1890, and 1994 in this context refer to the years laws were enacted creating these classifications of colleges and universities.

The FY2014 request would have provided \$1.29 billion for NIFA, \$46 million above the FY2013 enacted level (post-sequestration). The House and Senate committees recommended \$1.21 billion and \$1.28 billion, respectively. The omnibus appropriations act provided \$1.28 billion for FY2014. The FY2014 act directed the department to include additional information in the FY2015 budget that describes proposed funding levels, expected publication date, and scope for each funding announcement published by NIFA for research and extension grants.

The Administration's FY2014 request for NIFA also emphasized competitive, peer-reviewed allocation of research funding for what USDA perceives are the most critical needs of agriculture. For FY2014, the President requested \$383 million for NIFA's flagship competitive grant program, the Agriculture and Food Research Initiative (AFRI), 39% higher than FY2013 enacted funding (post-sequestration). The omnibus appropriations act provided \$316 million for AFRI in FY2014. AFRI's programs focus on plant and animal health and production, agricultural systems and technologies, bioenergy and natural resources, food safety, human nutrition, and health. Proposed major initiatives in FY2014 included (1) support of schools and colleges in the development of food and agriculture-related workforce; (2) water research to develop solutions for resource management; (3) REE efforts for food security; (4) nutrition and obesity prevention research; (5) food safety research with a focus on minimizing antibiotic resistance transmission through the food chain; (6) biomass research; and (7) strategies for farm production and climate change. To improve transparency and accountability, the President requested \$8 million to consolidate and modernize NIFA's grant management systems in order to help the agency better track research accomplishments.

The President's budget proposed the reorganization of several science, technology, engineering, and mathematics (STEM) programs across the executive branch. Under the reorganization, the National Science Foundation would have played a leadership role in federal undergraduate and graduate STEM education efforts, the Department of Education would focus on K-12 STEM education, and the Smithsonian Institution would have focused on informal STEM education. Under the President's plan, NIFA's STEM education programs would have been transferred to these agencies. (For additional information, see "Reorganization of STEM Education Programs.") In the omnibus appropriations act, Congress did not adopt the plan because it said the proposed reorganization contained in the budget request was incomplete and lacked sufficient detail.

The FY2014 budget request proposes \$78.5 million for ERS, compared with \$71.4 million in FY2013 (post-sequestration). The House and Senate committees recommended \$75.5 million and \$78.5 million, respectively. The omnibus appropriations act provided \$78.1 million for FY2014. ERS supports economic and social science information analysis on agriculture, rural development, food, commodity markets, and the environment. It collects and disseminates data concerning USDA programs and policies to various stakeholders.

The President proposed funding for the National Agricultural Statistics Service at \$159.6 million in FY2014, compared with \$166.6 million in FY2013 (post-sequestration). The FY2014 request included new funding to maintain production of four high-priority Current Industry Reports (CIR) that were formerly produced by the U.S. Census Bureau. The House and Senate committees recommended \$154.8 million and \$162.1 million, respectively. The omnibus appropriations act provided \$161.2 million for FY2014. In the explanatory statement for the FY2014 consolidated appropriations act, Congress provided funding to carry out the Administration plan for FY2014 and directed NASS to resume the CIR and other reports discontinued in recent years.

**Table 14. U.S. Department of Agriculture R&D**

(budget authority in millions of dollars)

Agency and Program	FY2013 Post- rescission, post- sequester	FY2014 President's Request	FY2014 House- reported H.R. 2410	FY2014 Senate- reported S. 1244	FY2014 Enacted
<b>Agricultural Research Service</b>	<b>1,016.9</b>	<b>1,279.0</b>	<b>1,074.2</b>	<b>1,123.2</b>	<b>1,122.5</b>
<b>Nat'l Institute of Food and Agriculture (NIFA)</b>	<b>1,142.0</b>	<b>1,288.3</b>	<b>1,208.9</b>	<b>1,277.5</b>	<b>1,277.1</b>
Research and Education	683.2	801.1	718.7	772.8	772.6
AFRI	275.6	383.4	290.7	316.4	316.4
Hatch Act	218.6	236.3	236.3	243.7	243.7
Evans-Allen	47.1	50.9	50.9	52.5	52.5
McIntire-Stennis	30.5	32.9	32.9	34.0	34.0
Extension	439.1	459.0	459.0	469.4	469.2
Smith-Lever(b)&(c)	271.3	294.0	294.0	300.0	300.0
Smith-Lever(d)	91.7	85.7	84.7	85.7	85.5
Integrated Activities	19.8	28.1	31.1	35.3	35.3
<b>Economic Research Service</b>	<b>71.4</b>	<b>78.5</b>	<b>75.5</b>	<b>78.5</b>	<b>78.1</b>
<b>Nat'l Agric. Statistics Service</b>	<b>166.6</b>	<b>159.6</b>	<b>154.8</b>	<b>162.1</b>	<b>161.2</b>
<b>Total</b>	<b>2,397.0</b>	<b>2,805.4</b>	<b>2,513.2</b>	<b>2,641.3</b>	<b>2,638.8</b>

**Source:** CRS Report R42110, *Federal Student Loan Discharge Procedures for Borrowers Who Become Totally and Permanently Disabled: Current Issues and Policy Considerations*, by David P. Smole and Umar Moulta-Ali, compiled from P.L. 111-80; P.L. 112-10; P.L. 112-55; P.L. 113-6; USDA/OBPA appropriations summary; U.S. Department of Agriculture, *FY2014 Budget Summary and Annual Performance Plan*, April 2013; H.R. 2410; S. 1244; and FY2014 Consolidated Appropriations Act, Joint Explanatory Statement.

**Note:** Additional budget and program information is available in USDA's budget explanatory notes for each agency found at [http://www.obpa.usda.gov/explan\\_notes.html](http://www.obpa.usda.gov/explan_notes.html).

## Department of the Interior<sup>96</sup>

Congress provided \$811.0 million to the Department of the Interior (DOI) for research and development for FY2014, \$18.3 million (2.3%) more than in FY2013 and \$155.5 million (16.1%) less than the President had requested. (See **Table 15**.) According to DOI,

This funding supports scientific monitoring, research, and analysis to assist decisionmaking in resource management and the special trust responsibilities of Interior and other federally-mandated and nationally-significant programs. Specific activities supported include energy permitting, ecosystem management, oil spill restoration, Earth observations, such as water and wildlife monitoring, invasive species control, and tribal natural resource management.<sup>97</sup>

<sup>96</sup> This section was written by John F. Sargent, Specialist in Science and Technology Policy, CRS Resources, Science, and Industry Division.

<sup>97</sup> Unpublished document, *Research and Development: 2014 Budget Summary*, provided via private e-mail (continued...)

The U.S. Geological Survey (USGS) accounts for most of DOI's R&D 80% of total DOI appropriations for R&D in FY2014). USGS is also the most R&D-intensive agency in DOI, with approximately 63% of its FY2014 funding devoted to R&D activities.

Funding for DOI R&D is generally included in line items that also include non-R&D funding. Therefore it is not possible to know precisely how much of the funding provided for in appropriations bills will be allocated to R&D unless funding is provided for at the precise level of the request. In general, R&D funding levels are known only after DOI agencies determine their allocation of appropriations. In January 2014, DOI provided detailed information to CRS on R&D funding levels proposed by the President for each of its agencies and for broad program areas as well as for agencies' allocations of FY2014 appropriations to R&D; these data were used for much of the analysis in this section.<sup>98</sup>

## U.S. Geological Survey

All USGS funding is provided through a single account, Surveys, Investigations, and Research (SIR). USGS R&D is conducted under seven SIR activity/program areas: Ecosystems; Climate and Land Use Change; Energy, Minerals, and Environmental Health; Natural Hazards; Water Resources; Core Science Systems; and Administration and Enterprise Information.

The President requested \$1.167 billion for USGS for FY2014, including \$760.5 million for R&D, an increase of \$87.7 million (13.0%) over the FY2012 R&D funding level of \$672.8 million. The largest requested increases for R&D were for Ecosystems, up \$22.5 million (14.2%); Climate and Land Use Change, up \$15.3 million (14.9%); and Core Science Systems, up \$18.9 million (21.4%).

Division G of the Consolidated Appropriations Act, 2014 (P.L. 113-76) provides a total of \$1.032 billion for the USGS Surveys, Investigations, and Research account. This amount includes \$648.1 million for research and development, \$10.2 million (1.6%) above the FY2013 level and \$112.5 million (14.8%) less than the request. The largest increase in FY2014 funding is for Ecosystems, up \$10.1 million (6.7%) from FY2013 to \$160.1 million; the largest decrease is for Water Resources which is down \$5.1 million (4.5%).<sup>99</sup>

## Other DOI Agencies

P.L. 113-76 provides FY2014 research and development funding of:

- \$30.5 million for the U.S. Fish and Wildlife Service, down \$2.1 million (6.4%) from FY2013;
- \$42.0 million for the Bureau of Ocean Energy Management, up \$4.0 million (10.4%) from FY2013;

---

(...continued)

correspondence between the DOI budget office and CRS, May 2, 2013

<sup>98</sup> Private e-mail correspondence between the DOI budget office and CRS, May 2, 2013.

<sup>99</sup> Private e-mail correspondence between the DOI budget office and CRS, January 27, 2014.

- \$26.1 million for the National Park Service, up \$1.4 million (5.5%) from FY2013;
- \$27.1 million for the Bureau of Safety and Environmental Enforcement , up \$1.3 million (5.0%) from FY2013;
- \$15.8 million for the Bureau of Land Management, no change from FY2013;
- \$16.6 million for the Bureau of Reclamation, up \$4.2 million (34.0%) from FY2013;
- \$6.0 million for the Office of Wildland Fire, up\$0.3 million (5.5%) from FY2013; and
- no funding for the Bureau of Indian Affairs and the Office of Surface Mining.<sup>100</sup>

**Table 15. Department of the Interior R&D**

(budget authority, in millions of dollars)

	<b>FY2013 Enacted P.L. 113-6</b>	<b>FY2014 Request</b>	<b>FY2014 Enacted</b>
U.S. Geological Survey	637.9	760.5	648.1
Bureau of Land Management	15.8	27.1	15.8
Bureau of Reclamation	12.4	17.6	16.6
National Park Service	24.7	34.1	26.1
Fish and Wildlife Service	32.5	50.1	30.5
Bureau of Ocean Energy Management	38.1	42.6	42.0
Bureau of Safety and Environmental Enforcement	25.8	28.0	27.1
Bureau of Indian Affairs	0	5.0	5.0
Office of Surface Mining	0	1.6	0
Office of Wildland Fire	5.7	6.0	6.0
<b>Total, DOI R&amp;D</b>	<b>792.8</b>	<b>972.6</b>	<b>87.01</b>

**Source:** Unpublished data provided to CRS by the DOI Budget Office on January 27, 2014.

**Note:** Totals may differ from the sum of the components due to rounding. n/a = not available.

<sup>100</sup> Ibid.

## Environmental Protection Agency<sup>101</sup>

The U.S. Environmental Protection Agency (EPA), the regulatory agency responsible for carrying out a number of environmental pollution control laws, funds a broad portfolio of research and development activities to provide scientific tools and knowledge to support decisions relating to preventing, regulating, and abating environmental pollution. Beginning in FY2006, EPA has been funded through the Interior, Environment, and Related Agencies appropriations bill. Funding for EPA R&D is generally included in line-items that also include non-R&D activities; therefore it is not possible to identify precisely how much of the funding provided for in appropriations bills will be allocated to EPA R&D specifically (see discussion later in this section). Much of EPA's scientific research activities, including R&D and related scientific evaluations conducted by universities, foundations, and other non-federal entities that receive EPA grants, as well as that conducted by the agency at its own laboratories and facilities are funded within the agency's Science and Technology (S&T) appropriations account. This account is funded by a "base" appropriation and a transfer from the Hazardous Substance Superfund (Superfund) account. These transferred funds are dedicated to research on more effective methods to clean up contaminated sites.

No bill providing regular appropriations for FY2014 for Interior, Environment, and Related Agencies was introduced in the House or Senate. On July 31, 2013, the House Appropriations Committee began, but did not conclude, a markup of a draft FY2014 appropriations bill,<sup>102</sup> and on August 1, 2013, the leaders of the Senate Appropriations Subcommittee on Interior, Environment, and Related Agencies released a draft bill<sup>103</sup> for FY2014 with an accompanying explanatory statement to serve as a starting point in the debate.<sup>104</sup> Prior to the enactment of P.L. 113-76, Consolidated Appropriations Act, 2014, EPA and other federal departments and agencies operated under two continuing resolutions (P.L. 113-46 and P.L. 113-73).

Title II of Division G under the Consolidated Appropriations Act, 2014 (H.R. 3547, P.L. 113-76) provided \$778.4 million for the EPA S&T account for FY2014 including transfers (\$19.2 million) from the Hazardous Substance Superfund account. The FY2014 total for the S&T account

<sup>101</sup> This section was written by Robert Esworthy, Specialist in Environmental Policy, CRS Resources, Science, and Industry Division. For a broader overview of EPA's FY2013 appropriations, see CRS Report R43207, *Environmental Protection Agency (EPA): Appropriations for FY2013 in P.L. 113-6*, by Robert Esworthy and David M. Bearden, and CRS Report R42520, *Environmental Protection Agency (EPA) Appropriations for FY2013: Debate During the 112<sup>th</sup> Congress*, coordinated by Robert Esworthy.

<sup>102</sup> The markup focused on the draft bill text and accompanying draft committee report language, House Appropriations Subcommittee on Interior, Environment, and Related Agencies, July 25, 2013. For the text of the draft bill, see House Committee on Appropriations website, <http://appropriations.house.gov/uploadedfiles/bills-113hr-fc-ap-fy2014-ap00-interior.pdf>; for text of the draft committee report, see <http://appropriations.house.gov/uploadedfiles/hrpt-113-hr-fy2014-interior.pdf>.

<sup>103</sup> The draft bill text is posted on the Senate Committee on Appropriations website at <http://www.appropriations.senate.gov/news.cfm?method=news.view&id=b3e22f9d-a060-45eb-90ef-1225244125a7>. The explanatory statement is posted on the Senate Committee on Appropriations website at <http://www.appropriations.senate.gov/news.cfm?method=news.view&id=d1037190-bf9c-420c-a8a5-79c0ef9c495c>.

<sup>104</sup> According to a joint statement released by the Chairman and Ranking Member of the Senate Subcommittee, the draft document was intended to "serve as a meaningful start as discussions continue to finalize a fiscally responsible, balanced FY 2014 Interior bill" (Committee on Appropriations, U.S. Senate, "Reed and Murkowski Release Draft of FY2014 Interior, Environment, and Related Agencies Appropriation Bill," press release, August 1, 2013, <http://www.appropriations.senate.gov/customcf/uploads/2a912190-bbd9-4a71-806e-380da102c96e/080113%20Interior%20Press%20Release%20-%20FINAL.pdf>).



(including the transfer), which represents 9.5% of the \$8.20 billion for the agency overall for FY2014 appropriations, was \$29.1 million (3.6%) less than the \$807.5 million requested for FY2014, but \$12.9 million (1.7%) above the FY2013 enacted post-sequestration level of \$765.5 million (FY2013 appropriations indicated in this section of the report reflect the application of sequestration and the additional across-the-board rescission).<sup>105</sup>

In addition to specifying FY2014 funding for the various scientific EPA programs and research areas within the S&T account, the Joint Explanatory Statement (JES)<sup>106</sup> for Division G under the act included additional direction to EPA with regard to certain activities. For example, among the additional guidance include in the JES, “EPA is directed to follow the directives and recommendations in H.Rept. 112-589 with respect to Endocrine Disruptor Research.” Also under the S&T heading in the JES, with respect to a previously congressionally directed National Academy Sciences (NAS) review of EPA’s *Integrated Risk Information System* (IRIS), the Agency is directed to “include in each draft and final IRIS assessment released in fiscal year 2014, documentation describing how EPA has implemented or addressed NAS Chapter 7 recommendations.” Additionally, EPA is encouraged to expeditiously comply with the Executive Office of the President’s Office of Science and Technology Policy February 2013 guidelines for increasing public access to the results of federally funded scientific research.

As indicated in **Table 16**, the total base (prior to transfers) appropriations provided in P.L. 113-76 of \$759.2 million for FY2014 for the S&T account is less than the FY2014 requested level of \$783.9 million, but an increase compared to the FY2013 enacted base level of \$743.8 million. The \$19.2 million transfer from the Superfund account for FY2014 is less than the \$23.5 million FY2014 requested transfer, and the \$21.7 million transferred in. For nearly all of the individual program and activity line items within the S&T account as presented **Table 16**, the FY2014 enacted appropriations were below the FY2014 requested levels but above the FY2013 post-sequestration levels with a few exceptions. As noted in the table the \$155.0 million FY2014 appropriation for “Research: Sustainable Healthy Communities,” is more than the \$147.4 million requested but less than the \$157.4 million provided for FY2013; FY2014 funding for “Homeland Security” and “Enforcement” program areas are less than both FY2014 requested and FY2013 levels. P.L. 113-76 also included \$4.2 million for “Research: National Priorities,” the same as FY2013, for competitively awarded research grants to fund “high-priority water quality and availability research by not-for-profit organizations.”<sup>107</sup> The President’s FY2014 budget request did not include funding for these “national priorities” within the S&T account or other accounts. As indicated in the table, some activities remained relatively flat compared to the FY2014 request and FY2013 appropriations.

The EPA S&T account incorporates elements of the former EPA Research and Development account, as well as a portion of the former Salaries and Expenses, and Program Operations

<sup>105</sup> FY2013 amounts are as presented in EPA’s FY2013 Operating Plan provided to CRS by the House Committee on Appropriations. The EPA Plan takes into account reductions due to sequestration that was triggered by the Budget Control Act of 2011 (P.L. 112-25) as amended, and an additional rescission required by Section 3004 of P.L. 113-6 to comply with the statutory limit on discretionary spending for FY2013 (subsequently determined by the Office of Management and budget to be 0.2%).

<sup>106</sup> See the Joint Explanatory Statement and Funding Table materials by division as printed in the January 15, 2014 Congressional Record, Book II, Title II Environmental Protection Agency, Science and Technology on pp.H977-H978, <http://www.congress.gov/crtext/113-datesection.shtml>.

<sup>107</sup> Ibid footnote 106.

accounts, which had been in place until FY1996.<sup>108</sup> Although the Office of Management and Budget (OMB) reports<sup>109</sup> historical and projected budget authority (BA) amounts for R&D at EPA (and other federal agencies), OMB documents do not describe how these amounts explicitly relate to the requested and appropriated funding amounts for the many specific EPA program activities. Typically, the R&D BA amounts reported by OMB have been considerably less than amounts appropriated and requested for the S&T account as a whole. (BA as reported by OMB is included in **Table 16** for purposes of comparison to fiscal year appropriations.) This is an indication that not all of the EPA S&T account funding is allocated to R&D.

R&D at EPA headquarters and laboratories around the country, as well as external R&D, is managed primarily by EPA's Office of Research and Development (ORD). A large portion of the S&T account funds EPA R&D activities managed by ORD, including the agency's research laboratories and research grants. The account also provides funding for the agency's applied science and technology activities conducted through its program offices (e.g., the Office of Water). Many of the programs implemented by other offices within EPA have a research component, but the research is not necessarily the primary focus of the program.

**Table 16. Environmental Protection Agency S&T Account**

(in millions of dollars)

<b>Environmental Protection Agency</b>	<b>FY2013 Enacted Post- Sequestration (P.L. 113-6)</b>	<b>FY2014 Request</b>	<b>FY2014 Enacted (P.L. 113-76)</b>
<b>Science and Technology Approps. Account</b>			
Clean Air and Climate	118.1	126.0	120.4
- Climate Protection Program	15.9	8.3	8.3
- Federal Vehicle & Fuel Standards & Certification	86.9	100.4	nr
Enforcement	14.5	15.9	14.1
Homeland Security	39.3	40.0	38.4
Indoor Air and Radiation	6.3	6.7	6.4
IT/Data Management/Security	3.5	4.0	3.5
Operations & Administration	67.7	75.7	70.4
Pesticide Licensing	6.2	6.2	6.2
Research: Air, Climate, and Energy	92.9	105.7	95.0
Research: Chemical Safety and Sustainability	123.3	134.8	130.8
- Research: Computational toxicology	nr	21.4	21.4

<sup>108</sup> In recent years, EPA's annual appropriations have been requested, considered, and enacted according to eight statutory appropriations accounts established by Congress during the FY1996 appropriations process. Because of the differences in the scope of the activities included in these accounts, apt comparisons before and after FY1996 are difficult.

<sup>109</sup> The Office of Management and Budget (OMB) reports R&D budget authority (BA) amounts in its Analytical Perspectives accompanying the annual President's budget request. See OMB, *Fiscal Year 2014 Budget of the United States: Analytical Perspectives—Special Topics/Research and Development*, pp. 369-375, <http://www.whitehouse.gov/sites/default/files/omb/budget/fy2014/assets/topics.pdf>.

<b>Environmental Protection Agency</b>	<b>FY2013 Enacted Post- Sequestration (P.L. 113-6)</b>	<b>FY2014 Request</b>	<b>FY2014 Enacted (P.L. 113-76)</b>
- Research: Endocrine disruptor	<i>nr</i>	15.9	16.3
Research: Safe and Sustainable Water	106.7	117.9	111.0
Research: Sustainable and Healthy Communities	157.4	147.4	155.0
Water: Human Health Protection	3.6	3.6	3.6
Research: National [Congressional] Priorities (Water Quality and Availability)	4.2	0.0	4.2
<b>—Subtotal S&amp;T Account Base Appropriations</b>	<b>\$743.8</b>	<b>\$783.9</b>	<b>\$759.2</b>
<b>—Transfer in from Hazardous Substance Superfund Account</b>	<b>\$21.7</b>	<b>\$23.5</b>	<b>\$19.2</b>
<b>Total Science and Technology</b>	<b>\$765.5</b>	<b>\$807.5</b>	<b>\$778.4</b>
<b>R&amp;D Budget Authority Reported by OMB</b>	<i>n/a</i>	\$560.0 est.	<i>n/a</i>

**Source:** Prepared by CRS. FY2013 enacted amounts are as reported in EPA's FY2013 Operating Plan submitted to the House and Senate Appropriations Committees on May 7, 2013, and reflect automatic spending reductions triggered by the Budget Control Act (BCA; P.L. 112-25) as amended. The FY2013 enacted levels also reflect the 0.2% across-the-board rescission required by the Consolidated and Further Continuing Appropriations Act, 2013 (P.L. 113-6). FY2014 requested amounts are based on the *Fiscal Year 2014 Justification of Appropriation Estimates for the Committee on Appropriations: Science and Technology*, <http://www2.epa.gov/sites/production/files/documents/cjfy14.pdf>. FY2014 enacted amounts are as presented in the table in the Joint Explanatory Statement for the Consolidated Appropriations Act, 2014 (H.R. 3547, P.L. 113-76) as printed in the January 15, 2014 Congressional Record, Book II, pp. H1010-H1011, <http://www.congress.gov/crtext/113-datesection.shtml>. OMB amounts of R&D budget authority are as reported in OMB, *Fiscal Year 2014 Budget of the United States: Analytical Perspectives—Special Topics/Research and Development*, pp. 369-375, <http://www.whitehouse.gov/sites/default/files/omb/budget/fy2014/assets/topics.pdf>. Totals may differ from the sum of the components due to rounding; nr = not reported, n/a = not available.

## Department of Transportation<sup>110</sup>

The Department of Transportation (DOT) funds highway, aviation, rail, transit, and other transportation-related research and development. In his FY2014 request, President Obama sought \$940.6 million for DOT R&D. (See **Table 17**.) Two agencies—the Federal Highway Administration (FHWA) and the Federal Aviation Administration (FAA)—accounted for 83.8% of the department's total R&D funding in FY2013.

In January 2014, Congress passed and the President signed the Consolidated Appropriations Act, 2014 (P.L. 113-76) providing funding for the Department of Transportation (DOT) and other federal departments and agencies for FY2014. Prior to the enactment of P.L. 113-76, two continuing resolutions (P.L. 113-46 and P.L. 113-73) provided FY2014 funding for DOT and other federal departments and agencies. For some agencies and accounts, it is possible to identify FY2014 R&D funding levels for the DOT and its agencies. In these cases the figures are provided below. In other cases it is not possible (e.g., where R&D funding is included in accounts with

<sup>110</sup> This section was written by John F. Sargent, Specialist in Science and Technology Policy, CRS Resources, Science, and Industry Division.

non-R&D activities). For these cases, funding levels will be included in future updates of this report as the information becomes available.

The FAA budget justification included a request for \$340.7 million for R&D and R&D facilities in FY2014.<sup>111</sup> Congress provided \$158.8 million for the FAA Research, Engineering, and Development (RE&D) account, \$7.2 million (4.3%) less than the request. The RE&D budget is focused on improving aviation safety, economic competitiveness, and environmental sustainability. Within the RE&D account, \$87.2 million was provided for aviation safety improvement, \$3.7 million (4.0%) below the request; \$24.3 million was provided for economic competitiveness, \$11.5 million (32.1%) below the request; and \$41.6 million was provided for environmental sustainability, \$8.1 million (24.0%) above the request. The House committee recommended \$145.0 million for RE&D; the Senate committee recommended \$160.0 million for RE&D. No funding was provided for Joint Planning and Development Office (JPDO). The House recommended no funding, stating that the “FAA has failed to establish a clearly defined role for the JPDO.”<sup>112</sup> The Senate recommended \$9.0 million for JPDO, \$3.1 million below the request.

The President requested \$379.8 million in FY2014 R&D funding for the FHWA.<sup>113</sup> The Department reported FY2013 FHWA R&D funding of \$369.2 million. For FY2014, the FHWA budget proposed to restructure its existing research, development, and technology activities into three programs, as authorized by the Moving Ahead for Progress in the 21<sup>st</sup> Century Act (MAP - 21, P.L. 112-141): Highway Research and Development (HRD), Technology and Innovation Deployment, and Training and Education. The President’s FY2014 request included \$115 million for HRD. The House Committee on Appropriations recommended the requested amount for FHWA. The Senate Committee on Appropriations also recommended the requested amount for FHWA, plus an additional \$500 million for bridges in critical condition.<sup>114</sup> Final R&D funding figures for FHWA R&D were not available at the time this report was published.

Congress provided funding of \$14.8 million for the Office of the Assistant Secretary for Research and Technology. The President’s FY2014 request sought to transfer the functions of the Research and Innovative Technology Administration (RITA) to a new office, the Office of the Assistant Secretary for Research and Technology. The department asserted that the establishment of the new office would “improve coordination and collaboration among operating administrations, resulting in higher quality research outcomes.” Activities to be administered by this office include Intelligent Transportation Systems (\$100 million in the FY2014 request), University Transportation Centers (\$72.5 million), and the Bureau of Transportation Statistics (\$26 million).<sup>115</sup> The House committee endorsed the President’s proposal to move RITA to the Office of the Secretary under the direction of an Assistant Secretary for Research and Technology, instead of a separate administrator. The House committee recommended \$14.2 million for the new office, \$545,000 below the President’s request. The new office would be responsible for

<sup>111</sup> FAA, *Budget Estimates Fiscal Year 2014: Federal Aviation Administration*, [http://www.dot.gov/sites/dot.dev/files/docs/FAA\\_FY2014\\_Budget\\_Estimates.pdf](http://www.dot.gov/sites/dot.dev/files/docs/FAA_FY2014_Budget_Estimates.pdf).

<sup>112</sup> H.Rept. 113-136, p. 28.

<sup>113</sup> FHWA, *Budget Estimates Fiscal Year 2014: Federal Highway Administration*, [http://www.dot.gov/sites/dot.dev/files/docs/FHWA\\_FY2014\\_Budget\\_Estimates\\_0.pdf](http://www.dot.gov/sites/dot.dev/files/docs/FHWA_FY2014_Budget_Estimates_0.pdf).

<sup>114</sup> S.Rept. 113-45, p. 42.

<sup>115</sup> U.S. Department of Transportation, *Budget Highlights: Fiscal Year 2014*, [http://www.dot.gov/sites/dot.dev/files/docs/OST\\_FY2014\\_Budget\\_EstimatesV2\\_0.pdf](http://www.dot.gov/sites/dot.dev/files/docs/OST_FY2014_Budget_EstimatesV2_0.pdf), p. 1.

coordinating, facilitating, and reviewing the Department's research and development programs and activities; coordinating and developing positioning, navigation and timing (PNT) technology; maintaining PNT policy, coordination and spectrum management; managing the Nationwide Differential Global Positioning System; and overseeing and providing direction to the Bureau of Transportation Statistics, the Intelligent Transportation Systems Joint Program Office, the University Transportation Centers program, the Volpe National Transportation Systems Center and the Transportation Safety Institute.<sup>116</sup>

The Senate committee also endorsed the President's proposal to move RITA to the Office of the Secretary under the direction of an Assistant Secretary for Research and Technology, recommending funding of \$14.8 million, the same as the President's request.<sup>117</sup>

The request sought to double Federal Railroad Administration R&D to \$90.8 million, largely for the establishment of a new account (the Research, Development, and Technology account) to support high-performance rail R&D (\$24.5 million), a National Cooperative Research Program (\$5.0 million), and Workforce Development R&D-related activities (\$24.8 million).<sup>118</sup> Congress provided \$35.3 million in FY2014 funding for the Railroad Research and Development account, the same as the request, and House committee and Senate committee recommendations. The Administration's proposed establishment of a Railroad Research, Development, and Technology account was not included in the FY2014 funding act, in agreement with House committee and Senate committee recommendations.<sup>119</sup>

Congress appropriated \$43 million for the Federal Transit Administration's (FTA) research program, including \$40 million for its national research program and \$3 million for its cooperative research program.<sup>120</sup> The President's request for the FTA included \$17.2 million for R&D. The request sought to redirect congressional funding for the Research, Development, Demonstration, and Deployment (RDD&D) account to support R&D activities rather than its previous support for technology investments.<sup>121</sup> The House recommended \$20.0 million for the RDD&D account;<sup>122</sup> the Senate committee recommended \$43.3 million.<sup>123</sup> The House committee also recommended extending FTA's authorities under MAP-21 (P.L. 112-141) to allow the agency to "award grants to demonstrate and deploy new technologies that promote clean energy and improve air quality with low-emission or no-emission vehicles."<sup>124</sup>

<sup>116</sup> H.Rept. 113-136, p. 8.

<sup>117</sup> S.Rept. 113-45, p. 21.

<sup>118</sup> FRA, *Budget Estimates Fiscal Year 2014: Federal Railroad Administration*, [http://www.dot.gov/sites/dot.dev/files/docs/FRA\\_FY2014\\_Budget\\_Estimates.pdf](http://www.dot.gov/sites/dot.dev/files/docs/FRA_FY2014_Budget_Estimates.pdf).

<sup>119</sup> H.Rept. 113-136, p. 44; S.Rept. 113-45, p. 189.

<sup>120</sup> The cooperative research program is administered by the National Research Council's Transportation Research Board.

<sup>121</sup> Congress articulated the new direction in MAP-21, the Moving Ahead for Progress in the 21<sup>st</sup> Century Act (P.L. 112-141).

<sup>122</sup> H.Rept. 113-136, p. 54.

<sup>123</sup> S.Rept. 113-45, p. 80.

<sup>124</sup> H.Rept. 113-136, p. 54.

**Table 17. Department of Transportation R&D**

(budget authority, in millions of dollars)

	<b>FY2013 Enacted<sup>a</sup></b>	<b>FY2014 Request</b>	<b>FY2014 Enacted</b>
Federal Highway Administration	369.2	379.8	n/a
Federal Aviation Administration	315.1	340.7	n/a
Federal Railroad Administration	37.7	90.8	n/a
National Highway Traffic Safety Administration	64.9	73.4	n/a
Federal Transit Administration	0	17.2	n/a
Pipeline & Hazardous Materials Safety Administration	8.2	16.4	n/a
Office of the Secretary	9.0	14.8	n/a
Federal Motor Carrier Safety Administration	6.9	7.5	n/a
Research and Innovative Technology Administration	5.7		
<b>Total, DOT R&amp;D</b>	<b>816.6</b>	<b>940.6</b>	<b>n/a</b>

**Source:** DOT FY2014 department and agency budget justifications; personal e-mail communication with the Department of Transportation, November 18, 2013.

**Notes:** Figures include R&D and R&D facilities. n/a = not available. Totals may differ from the sum of the components due to rounding. Research and development funds are included in accounts that also have non-R&D activities.

- a. The post-rescission, post-sequester FY2013 figures were provided to CRS by the Department of Transportation by e-mail on November 18, 2013.



## **Author Contact Information**

John F. Sargent Jr.  
Specialist in Science and Technology Policy  
jsargent@crs.loc.gov, 7-9147

Robert Esworthy  
Specialist in Environmental Policy  
resworthy@crs.loc.gov, 7-7236

Heather B. Gonzalez  
Specialist in Science and Technology Policy  
hgonzalez@crs.loc.gov, 7-1895

Judith A. Johnson  
Specialist in Biomedical Policy  
jajohnson@crs.loc.gov, 7-7077

Daniel Morgan  
Specialist in Science and Technology Policy  
dmorgan@crs.loc.gov, 7-5849

John D. Moteff  
Specialist in Science and Technology Policy  
jmoteff@crs.loc.gov, 7-1435

Dennis A. Shields  
Specialist in Agricultural Policy  
dshields@crs.loc.gov, 7-9051

Harold F. Upton  
Analyst in Natural Resources Policy  
hupton@crs.loc.gov, 7-2264